

**EXHIBIT A**

<u>City</u>	<u>Plaintiff</u>	<u>Defendant</u>	<u>File No.</u>	<u>Date</u>
Bayreuth	Lichtblick Films GmbH	Tannreuther, E.	109 C 1027/14	2014-11-25
Bad Urach	KSM GmbH	Hildebrandt, G.	1 C 297/14	2014-12-03
Frankfurt am Main	MIG Film GmbH	Mörke	30 C 2152/14 (45)	2014-12-11
Bielefeld	Lichtblick Films GmbH	Rohleder	42 C 477/14	2014-12-22
Bielefeld	Telepool GmbH	Steinkok	42 C 798/14	2015-02-02
Düsseldorf	Europool Europäische Medienbeteiligungs-GmbH	Felderhoff	57 C 8758/14	2015-02-02
Wiesloch	KSM GmbH	Reichelt, J.	2 C 114/14	2015-02-05
Bielefeld	Lichtblick Films GmbH	Krajina	42 C 588/14	2015-02-09
Potsdam	MIG Film GmbH	Weicht, E.	20 C 226/14	2015-02-11
Singen	I-ON New Media GmbH	Woll, M.	8 C 369/14	2015-02-23
Bielefeld	KSM GmbH	Gieseler	42 C 748/14	2015-03-02
Bielefeld	Europool Europäische Medienbeteiligungs-GmbH	Vertgewall	42 C 796/14	2015-03-02
Bielefeld	Hanway Brown Limited	Zimmer	42 C 458/14	2015-03-02
München	KSM GmbH	Schulte, W.	233 C 17044/14	2015-03-02
Leipzig	Europool Europäische Medienbeteiligungs-GmbH	Riha, T.	118 C 5887/14	2015-03-11
Bielefeld	Europool Europäische Medienbeteiligungs-GmbH	Despang	42 C 566/14	2015-03-16
Weiden in der Oberpfalz	Hanway Brown Limited	Günther, W.	2 C 615/14	2015-03-25
Potsdam	MIG Film GmbH	Engler, C.	21 C 216/14	2015-03-31
Landshut	KSM GmbH	Hausmanninger, J.	1 C 1257/14	2015-04-15
München	KSM GmbH	Hamann, W.	223 C 16998/14	2015-04-23
München	Europool Europäische Medienbeteiligungs-GmbH	Hoti, L.	213 C 27040/14	2015-04-27
Erfurt	KSM GmbH	Kalff	16 C 1858/14	2015-05-19
Würzburg	KSM GmbH	Schießer, E.	32 C 1984/14	2015-05-27
Erfurt	KSM GmbH	Elflein	14 C 1839/14	2015-06-03
Erfurt	Europool Europäische Medienbeteiligungs-GmbH	Sturm	14 C 2186/14	2015-06-10
Erfurt	KSM GmbH	Frank	14 C 1842/14	2015-06-10
Nürtingen	Europool Europäische Medienbeteiligungs-GmbH	Klein, V.	17 C 1563/14	2015-06-11
Hannover	KSM GmbH	Kuznik	531 C 8352/14	2015-06-12
Erfurt	KSM GmbH	Dick	14 C 1837/14	2015-06-17
Erfurt	Europool Europäische Medienbeteiligungs-GmbH	Skoluda	14 C 2184/14	2015-06-17
Düsseldorf	Europool Europäische Medienbeteiligungs-GmbH	Felderhoff	57 C 8758/14	2015-06-22
Düsseldorf	Europool Europäische Medienbeteiligungs-GmbH	Wolff	57 C 9377/14	2015-07-08
Düsseldorf	KSM GmbH	Ciftci	57 C 9677/14	2015-07-08
Erfurt	KSM GmbH	Schmidt	14 C 1954/14	2015-07-15
Halle (Saale)	Condor Gesellschaft für Forderungsmanagement	Heleske	104 C 3438/14	2015-10-07
Würzburg	Europool Europäische Medienbeteiligungs-GmbH	Pfeuffer, H.	32 C 1891/14	2015-09-02
Freiburg im Breisgau	Christian Meinke MFA + Filmdistribution e.K.	Lovec, A.	5 C 1989/14	2015-07-28
Düsseldorf	Christian Meinke MFA + Filmdistribution e.K.	Heinen	57 C 9846/14	2015-09-23
Bühl	KSM GmbH	Ade, C.	3 C 357/14	2015-09-09
Leipzig	KSM GmbH	Heinz, R.	05 S 106/15	2015-10-28
Bielefeld	Foresight Unlimited LLC	Siemens	42 C 886/14	2015-09-18
Karlsruhe	KSM GmbH	Demangeot	101 AR 32/15	2015-09-30
Magdeburg	Europool Europäische Medienbeteiligungs-GmbH	Käsebier	7 S 150/15	2016-04-06
Magdeburg	Europool Europäische Medienbeteiligungs-GmbH	Heine	7 S 182/15	2015-12-02
Magdeburg	Europool Europäische Medienbeteiligungs-GmbH	Rinker	7 S 261/15	2015-12-02
Erfurt	MIG Film GmbH	Manes	11 C 2511/14	2016-01-13
Magdeburg	Europool Europäische Medienbeteiligungs-GmbH	Templin, Manuela	7 S 190/15	2016-04-06
Bühl	Europool Europäische Medienbeteiligungs-GmbH	Stribny, M.	7 C 225/14	2015-09-30
Bielefeld	KSM GmbH	Büscher	42 C 608/14	2014-12-22
Karlsruhe	KSM GmbH	Awe	103 AR 34/15	2015-12-09
Aschaffenburg	KSM GmbH	Strewenski, J.	126 C 1329/14	2016-01-27
Magdeburg	KSM GmbH	Kresin	7 S 294/15	2016-03-02
Karlsruhe	Splendid Film GmbH	Bischoff, S.	6 C 194/15	2015-11-27
Magdeburg	KSM GmbH	Schmiedecke	7 S 184/15	2015-12-02
Magdeburg	KSM GmbH	König	7 S 350/15	2015-03-02
Bochum	Europool Europäische Medienbeteiligungs-GmbH	Wolf	I-5 S 139/15	2016-03-04
Homburg	KSM GmbH	Simon	4 C 139/15	2016-01-22
Bochum	Europool Europäische Medienbeteiligungs-GmbH	Gashi	I-5 S 115/15	2016-03-04
Magdeburg	Europool Europäische Medienbeteiligungs-GmbH	Müller	7 S 238/15	2016-04-06
Magdeburg	KSM GmbH	Fuhrmann, Mario	7 S 291/15	2016-01-13
Coburg	Splendid Film GmbH	Baum, S.,	14 C 1619/15	2016-01-27
Karlsruhe	Splendid Film GmbH	Bischoff, S.	6 C 194/15	2016-02-12
Hamburg	Christian Meinke MFA + Filmdistribution e.K.	Reye, A.	35a C 366/14	2016-04-21
Magdeburg	Europool Europäische Medienbeteiligungs-GmbH	Stier (Drechsler)	7 S 452/15	2016-05-04

Bochum	Europool Europäische Medienbeteiligungs-GmbH	Yildiz	I-5 S 57/15	2016-04-22
Halle (Saale)	MIG Film GmbH	Reichenbach	91 C 1617/14	2016-04-12
Halle (Saale)	Europool Europäische Medienbeteiligungs-GmbH	Reichenbach	104 C 3369/14	2016-04-13
Halle (Saale)	KSM GmbH	Reichenbach	104 C 3654/14	2016-04-13
Bochum	KSM GmbH	Genowski	I-5 S 147/15	2016-07-01
Bochum	Europool Europäische Medienbeteiligungs-GmbH	Robinson	I-5 S 150/15	2016-07-01
Bochum	Hanway Brown Limited	El Moutaouakkil	I-5 S 176/15	2016-07-22
Saarbrücken	Christian Meinke MFA + Filmdistribution e.K.	Weissbrod	7 S 10/15	2016-06-22
Magdeburg	KSM GmbH	Franz	7 S 131/16	2016-11-02
Saarbrücken	KSM GmbH	Johann	7 S 9/15	2016-06-22
Saarbrücken	Europool Europäische Medienbeteiligungs-GmbH	Pieter	7 S 7/16	2016-06-22
München	Splendid Film GmbH	Cichon, J.	224 C 16522/15	2017-02-02
Magdeburg	KSM GmbH	Hasselberg	7 S 437/15	2016-09-07
Aschaffenburg	MIG Film GmbH	Strewenski, J.	123 C 1085/14	2016-09-06
Flensburg	KSM GmbH	Hayn, H.	69 C 151/14	2016-09-14
Erfurt	WVG Medien GmbH	Miller, I.	14 C 911/16	2016-09-14
Bielefeld	WVG Medien GmbH	Vihocencu	42 C 78/16	2017-01-20
Bochum	Splendid Film GmbH	Cakici	I-5 S 135/16	2017-03-31
Bochum	WVG Medien GmbH	Hill	I-5 S 114/16	2017-04-28

**EXHIBIT B**

Case No.	Doe No.	IP Address	Highest BitField Value	Minutes Obtained
17-cv-988	4	73.109.59.21	63%	59.22
17-cv-988	8	76.104.164.10	100%	94
17-cv-988	10	73.225.191.224	83%	78.02
17-cv-990	2	24.19.211.34	100%	94
17-cv-990	4	98.247.18.38	100%	94
17-cv-990	12	98.246.186.136	100%	94
17-cv-991	5	24.17.156.89	100%	94
17-cv-991	7	24.18.152.183	100%	94
17-cv-991	9	67.160.48.197	100%	94
17-cv-991	10	71.227.250.188	100%	94
17-cv-991	12	71.227.200.10	100%	94
17-cv-991	14	24.17.73.114	100%	94
17-cv-991	16	67.170.117.201	100%	94
17-cv-1074	1	73.35.154.61	100%	94
17-cv-1074	2	73.221.157.230	100%	94
17-cv-1074	8	24.18.98.191	100%	94
17-cv-1074	9	73.140.216.17	100%	94
17-cv-1074	12	24.18.231.158	100%	94
17-cv-1074	13	98.203.160.243	100%	94
17-cv-1074	15	73.190.125.141	41%	38.54
17-cv-1074	16	50.170.67.67	100%	94
17-cv-1074	17	50.135.77.150	100%	94
17-cv-1075	1	73.109.57.61	12%	11.28
17-cv-1075	2	71.231.33.217	100%	94
17-cv-1075	3	24.19.29.24	100%	94
17-cv-1075	5	24.22.144.36	100%	94
17-cv-1075	7	24.19.73.108	100%	94
17-cv-1075	8	71.197.176.224	100%	94
17-cv-1075	10	71.231.111.180	100%	94
17-cv-1075	11	73.221.95.151	100%	94
17-cv-1076	1	67.189.71.60	100%	94
17-cv-1076	2	73.109.216.89	100%	94
17-cv-1076	3	73.35.164.24	100%	94
17-cv-1076	5	67.170.24.33	100%	94
17-cv-1076	7	73.109.64.70	100%	94
17-cv-1160	5	73.109.56.128	100%	94
17-cv-1163	4	24.22.111.47	100%	94
17-cv-1163	5	24.20.90.101	100%	94
17-cv-1163	9	71.238.3.70	100%	94
17-cv-1163	12	73.19.87.17	52%	48.88
17-cv-1164	1	73.83.201.27	100%	94
17-cv-1164	2	71.197.173.23	100%	94
17-cv-1164	4	71.59.174.139	100%	94

Case No.	Doe No.	IP Address	Highest BitField Value	Minutes Obtained
17-cv-1164	11	73.67.255.15	100%	94
17-cv-1164	12	24.18.50.138	100%	94
17-cv-1164	14	24.19.79.167	100%	94
17-cv-1211	9	73.109.59.95	100%	94
17-cv-1211	12	73.225.177.247	17%	15.98
17-cv-1211	14	24.17.42.67	72%	67.68
17-cv-1211	16	24.22.76.107	100%	94
17-cv-1211	17	24.16.234.96	12%	11.28
17-cv-1211	18	73.169.155.51	100%	94
17-cv-1211	19	73.109.57.83	42%	39.48
17-cv-1219	2	73.239.84.37	33%	31.02
17-cv-1219	4	76.104.191.213	100%	94
17-cv-1403	2	73.221.127.157	100%	94
17-cv-1403	5	73.109.57.2	100%	94
17-cv-1403	6	73.35.128.119	100%	94
17-cv-1403	7	67.183.57.38	100%	94
17-cv-1403	8	71.193.216.76	100%	94
17-cv-1403	10	73.109.58.244	100%	94
17-cv-1403	11	73.157.29.152	67%	62.98

**EXHIBIT C**

# Infringement Capture Log for IP Address 73.109.59.21



<u>IP</u>	<u>TorrentHash</u>	<u>Torrentname</u>	<u>Bitfield</u>	<u>Hitdate</u>
73.109.59.21	9CD3B5E17B19740BCD9A2DEA0EFAD3C5ED0DBE43	Once.Upon.a.Time.in.Venice.2017.720p.WEB-DL.x264-M2Tv	1	6/22/2017 7:57
73.109.59.21	9CD3B5E17B19740BCD9A2DEA0EFAD3C5ED0DBE43	Once.Upon.a.Time.in.Venice.2017.720p.WEB-DL.x264-M2Tv	2	6/22/2017 7:59
73.109.59.21	9CD3B5E17B19740BCD9A2DEA0EFAD3C5ED0DBE43	Once.Upon.a.Time.in.Venice.2017.720p.WEB-DL.x264-M2Tv	16	6/22/2017 9:02
73.109.59.21	9CD3B5E17B19740BCD9A2DEA0EFAD3C5ED0DBE43	Once.Upon.a.Time.in.Venice.2017.720p.WEB-DL.x264-M2Tv	16	6/22/2017 9:02
73.109.59.21	9CD3B5E17B19740BCD9A2DEA0EFAD3C5ED0DBE43	Once.Upon.a.Time.in.Venice.2017.720p.WEB-DL.x264-M2Tv	38	6/22/2017 9:49
73.109.59.21	9CD3B5E17B19740BCD9A2DEA0EFAD3C5ED0DBE43	Once.Upon.a.Time.in.Venice.2017.720p.WEB-DL.x264-M2Tv	63	6/22/2017 10:02

# Infringement Capture Log for IP Address 76.104.164.10

<u>IP</u>	<u>TorrentHash</u>	<u>Torrentname</u>	<u>Bitfield</u>	<u>Hitdate</u>
76.104.164.10	9CD3B5E17B19740BCD9A2DEA0EFAD3C5ED0DBE43	Once.Upon.a.Time.in.Venice.2017.720p.WEB-DL.x264-M2Tv	36	6/19/2017 6:52
76.104.164.10	9CD3B5E17B19740BCD9A2DEA0EFAD3C5ED0DBE43	Once.Upon.a.Time.in.Venice.2017.720p.WEB-DL.x264-M2Tv	39	6/19/2017 7:12
76.104.164.10	9CD3B5E17B19740BCD9A2DEA0EFAD3C5ED0DBE43	Once.Upon.a.Time.in.Venice.2017.720p.WEB-DL.x264-M2Tv	100	6/19/2017 7:55
76.104.164.10	9CD3B5E17B19740BCD9A2DEA0EFAD3C5ED0DBE43	Once.Upon.a.Time.in.Venice.2017.720p.WEB-DL.x264-M2Tv	100	6/19/2017 8:18
76.104.164.10	9CD3B5E17B19740BCD9A2DEA0EFAD3C5ED0DBE43	Once.Upon.a.Time.in.Venice.2017.720p.WEB-DL.x264-M2Tv	100	6/19/2017 8:56
76.104.164.10	9CD3B5E17B19740BCD9A2DEA0EFAD3C5ED0DBE43	Once.Upon.a.Time.in.Venice.2017.720p.WEB-DL.x264-M2Tv	100	6/19/2017 9:18
76.104.164.10	9CD3B5E17B19740BCD9A2DEA0EFAD3C5ED0DBE43	Once.Upon.a.Time.in.Venice.2017.720p.WEB-DL.x264-M2Tv	100	6/19/2017 10:05
76.104.164.10	9CD3B5E17B19740BCD9A2DEA0EFAD3C5ED0DBE43	Once.Upon.a.Time.in.Venice.2017.720p.WEB-DL.x264-M2Tv	100	6/19/2017 11:29

# Infringement Capture Log for IP Address 73.225.191.224

<u>IP</u>	<u>TorrentHash</u>	<u>Torrentname</u>	<u>Bitfield</u>	<u>Hitdate</u>
73.225.191.224	9CD3B5E17B19740BCD9A2DEA0EFAD3C5ED0DBE43	Once.Upon.a.Time.in.Venice.2017.720p.WEB-DL.x264-M2Tv	2	6/18/2017 10:47
73.225.191.224	9CD3B5E17B19740BCD9A2DEA0EFAD3C5ED0DBE43	Once.Upon.a.Time.in.Venice.2017.720p.WEB-DL.x264-M2Tv	39	6/18/2017 11:29
73.225.191.224	9CD3B5E17B19740BCD9A2DEA0EFAD3C5ED0DBE43	Once.Upon.a.Time.in.Venice.2017.720p.WEB-DL.x264-M2Tv	57	6/18/2017 11:48
73.225.191.224	9CD3B5E17B19740BCD9A2DEA0EFAD3C5ED0DBE43	Once.Upon.a.Time.in.Venice.2017.720p.WEB-DL.x264-M2Tv	77	6/18/2017 12:29
73.225.191.224	9CD3B5E17B19740BCD9A2DEA0EFAD3C5ED0DBE43	Once.Upon.a.Time.in.Venice.2017.720p.WEB-DL.x264-M2Tv	83	6/18/2017 12:48

**EXHIBIT D**

# Additional Evidence for IP Address 73.109.59.21

IP	Torrent Name	Torrent Hash	First Seen
73.109.59.21	Good Kids 2016 DVDRip XviDETRG	87C0E2E942C05CD4141DDE12E9E1D45BFC2AAFOC	10/6/2016
73.109.59.21	PassagetoMars2016HDRipXviDAC3EVO in Adventure by Silmarillion	022DED867D57091939F80BA6D6493D5E05AE3FE3	10/6/2016
73.109.59.21	StarTrekBeyond2016HDTSHCx264AACiidvd in SciFi	FCA2AB571B048970758E86A09029D69D8E61283F	10/6/2016
73.109.59.21	CriminalMindsS12E02HDTVXviDFUM[ettv] in Other by ettv	81D4DDFA0438449F4983A341F8582C1BC197A076	10/6/2016
73.109.59.21	The Jungle Book	AA59E90AB47F8197038F60C0D1DA2B6B157937E9	10/7/2016
73.109.59.21	LondonTown2016HDRipXviDAC3EVO in Drama by Silmarillion	776D3EB6C7166A7CCB1F67F10B6EBE2B5FF258A3	10/9/2016
73.109.59.21	Harry Potter And The Deathly Hallows Part 2 2011 720p YIFY	180BAF28690926163D5D0359EFAE1CC104A6C98C	10/11/2016
73.109.59.21	TimelessS01E02HDTVXviDFUM[ettv] in Other by ettv	B2AD8026F11CBFE117F8DC98BE26B0113D05B11F	10/11/2016
73.109.59.21	TheStrainS03E02HDTVx264FUM[ettv] in The Strain	4E0FE51F9D630F17B2F58A2A3131A3F4EFDCC2683	10/11/2016
73.109.59.21	The Strain S03E01 HDTV x264KILLERS[ettv]	0225718F8AFC35A01799C80BCF7F4C4ED6D67C9	10/11/2016
73.109.59.21	Nero 7 + KeyGen	3E0E15DE123F148D49EDE3A696F95FF22B9C214C	10/12/2016
73.109.59.21	SausageParty2016HDCamHQMicXvidAC3UnKnOwNHiveCM8	190AA7CEFF56EDD1EC740808466CE0A9D9E0DD6A	10/14/2016
73.109.59.21	Once Upon aTime S06E01 WEBDL x264FUM[ettv]	18235E5D1E7F5F2A534E3BCE6FA10274AEC6D185	10/14/2016
73.109.59.21	Pixels 2015 1080p BrRip x264 YIFY in Movies Other	D5A14DD9675E85750E60051FC86F0AB402E9443F	10/15/2016
73.109.59.21	Finding Dory 2016 HDTs x264 AC3 VAIiN movies animation	936CBA889200CDA737E2DAA92866D0F3608A0A34	10/15/2016
73.109.59.21	Batman v Superman Dawn of Justice 2016 Extended Ultimate Edition 720p WEB DL 1 5GB MkvCage mkv movies highres	B01B9CE7571FEEA17DACCBE42F0E8334373AB64	10/16/2016
73.109.59.21	The Dave Ramsey Show 091809	A5F530008518E3F04A4490A23BC378E94AE9C22C	10/17/2016
73.109.59.21	BeyoncÃ© Lemonade Beyonce [320] 2016	B6288C5CD64E4642F054056B4F296BB3BB1FBE38	10/18/2016
73.109.59.21	T D Jakes Run On mp3	A0170938092B1FB0A9361FEA28AC3B68E73E7A22	10/18/2016
73.109.59.21	Hacking Wireless Networks For Dummies [pdf+epub+mobi]	0CA4C8E7FB26A354B1A7AA15BAEAF26067C66811	10/18/2016
73.109.59.21	Manskills How to Avoid Embarrassing Yourself and Impress Everyone Else + The Mans Manual Chris PetersonGregg Stebben PdfEpubMobi Mantesh	9003EA7F32B579C300DBEF5A40B4E4616F1A55B3	10/18/2016
73.109.59.21	Logo Design Workbook A HandsOn Guide to Creating Logos	87DE8C965FFEDAC19D9180449A934DCA4892C59	10/18/2016
73.109.59.21	Mr Robot Season 1 720p BluRay x264 ShAaNiG in Other	10255B52D6E7041D75770F091A697F74ECC90393	10/18/2016
73.109.59.21	Glenn Gould A State of Wonder Goldberg Variations mp3 Lame V0	61F9097E52270FCAFFEB88D1466286AE4850293A	10/19/2016
73.109.59.21	ChannelZeroS01E01HDTVx264LOL[ettv] in Other by ettv	FE5F07022CF625C15251D9513C04D00668291C2E	10/19/2016
73.109.59.21	The Secret life of Pets NEW HD TS x264 AC3 DADDY movies animation	38E84761D21E3F7344BFEF3768E0954635C0B212	10/22/2016
73.109.59.21	The 5th Wave 2016 HDRip XviD AC3 EVO movies	9A4FAC31E6A4D63663CB91AF2BDF90574958E88A	10/22/2016
73.109.59.21	2ThePurgeElectionYear2016HCHDRipXviDAC3EVO in Action	0681E330488E15301816CF6F7026BE02ECE607AE	10/22/2016
73.109.59.21	Race 2016 1080p BluRay x264 DTS JYK movies highres	F4A1EEEC8939CBFFA085FF28E3216AE61489BC69	10/22/2016
73.109.59.21	Daddys Home 2015 BRRip XviD AC3 EVO movies	916DF51886A1FF8D0947347F5EB5B926105C8C82	10/22/2016
73.109.59.21	Independence Day Resurgence 2016 720p HC HDRIP 900MB NBY in Action	192EF08FBCAC763BFD8CF0137EADC305542A6F327	10/22/2016
73.109.59.21	Suicide Squad 2016 HDTs x264CPG	1BBB8CF2630D89ECE682EB3D100C46155C29CDF9	10/22/2016
73.109.59.21	Independence Day 1996 EXTENDED 1080p BluRay 6CH ShAaNiG mkv movies highres	C2F3013BE51E06A13F8A2142CF975EE7F345D4F0	10/22/2016
73.109.59.21	BackintheDay2016HDRipXviDETRG in Drama	D8D5701A7701D8BDAA4927DD51FE28E84AEC6A00	10/22/2016
73.109.59.21	Kung Fu Panda 3 2016 1080p WEBDL x264 AACJYK in Animation	D3E2D57BE443C33681D1C91027E513B75CEAC5EF	10/22/2016
73.109.59.21	London Has Fallen 2016 720p WEB DL 800MB ShAaNiG mkv movies	ED5E7F853C1DCC2946B826E7070C9D9F804A52F8	10/22/2016
73.109.59.21	Skiptrace 2016 1080p BluRay x264 DTSJYK	E923468E12BBF04E7AE39C2D57AAC8AF1DDF48D3	10/22/2016
73.109.59.21	Equals 2015 HDRip XviD AC3 EVO movies	5201E6BB040473FCE94B8CF6ABAF79B414E2ACFC	10/22/2016
73.109.59.21	LEGO DC Super Heroes Justice League Gotham City Breakout 2016 HDRip XviD AC3 EVO movies	59A09264EFC083F2C82B8F235B1B95643960CC1F	10/22/2016
73.109.59.21	Zootopia 2016 1080p BrRip x264 VPPV movies highres	63501941C7D252DC19EB66E2629182457ECA0543	10/22/2016
73.109.59.21	River2015BRRipXviDAC3EVO in Thriller	17E168961BA51BFF211802408C5ADCD2B2B65025	10/22/2016
73.109.59.21	WestworldS01E03PROPERHDTVx264KILLERS[ettv] in Other by ettv	23ECB8F75446D01D1B04A832BE5BD98CB0691B13	10/25/2016
73.109.59.21	The Mechanic 2011	4D54644D03FA461DD2FA435B30A0C45EDFFB8249	11/3/2016
73.109.59.21	Trainspotting 1996 1080p BrRip x264 YIFY	C613170D2EEB5057F4B4A6D0847699761FEDF382	11/3/2016
73.109.59.21	A Flying Jatt 2016 Hindi 720p HDTV x264 AAC Downloadhub	7384129432F26989C3029F9F8AA2AD8D01CED716	11/5/2016
73.109.59.21	Harry Potter Complete Collection 2001 2011 1080p BluRay x264 DTS ETRG movies	E925EE54DF2FC094B2F98A173A1E818109BE52D6	11/6/2016
73.109.59.21	Miracles from Heaven 2016 720p WEBDL 900MB ShAaNiG in Drama	BC407555BD642BC644908A81D89D9E4B87F5D4D1	11/7/2016
73.109.59.21	Pitch Perfect 2 2015 720p BrRip x264 YIFY movies highres	FA1EBDA61C3EAECAF3F05B1E4FEC4CB79C703B55	11/8/2016
73.109.59.21	Maleficent 2014 720p BrRip x264 YIFY	F4FB610CE04CCC7EFA208B22ED7DCDBF0FE4502D	11/8/2016
73.109.59.21	Pixels 2015 720p BrRip x264 YIFY in Movies Other	3AC74694D246FAEDA2E58CF190BDA48899458C48	11/8/2016
73.109.59.21	Labyrinth 1986 720p BrRip x264 650MB YIFY	6FF04F31E9D5253DA1364F57A9CAD225456E07	11/8/2016
73.109.59.21	Now You See Me 2013 EXTENDED ReRip 720p BrRip x264 YIFY	00CF87D0AC9335343183F7101BB86244FF02348F	11/8/2016
73.109.59.21	Divergent 2014 1080p BrRip x264 YIFY	2D58067BEE4D36F294D0485F2506815C32A89900	11/8/2016
73.109.59.21	Dumb and Dumber To 2014 720p BrRip x264 YIFY	7A78008DFA3B901BE48A3484F81CD4FA65716639	11/8/2016
73.109.59.21	Get Hard 2015 720p BrRip x264 YIFY movies highres	A07484D413830E06E9B76BF76C2B1333F0B25BA7	11/8/2016



73.109.59.21	Kurt Cobain Montage of Heck 2015 1080p BrRip x264 YIFY movies highres	D77524F775DACB3D2388C3512AA2F559C7E4B7BD	11/8/2016
73.109.59.21	The Fault in Our Stars 2014 1080p BrRip x264 YIFY	1D92D1128EDCE4B465E1355D4C002F2F2902F992	11/8/2016
73.109.59.21	The Lion King 2 Simba39s Pride 1998 720p Bluray 500MB YIFY	1295FE180D708FB45F6E70CE21576A8CC099B4D6	11/8/2016
73.109.59.21	Into the Woods 2014 1080p BrRip x264 YIFY movies highres	4E660F05AD95F61950985C3A6702AE605E41B649	11/8/2016
73.109.59.21	NowYouSeeMe22016BRRipXViDETRG in Action	E9847149C962779A2A004780A01949FD02BB4122	11/9/2016
73.109.59.21	Now You See Me 2 2016 TS [RUSSIAN]	AB21A25259FC9546EE438DCC9735FF2ED3E06F3F	11/9/2016
73.109.59.21	NowYouSeeMe2013EXTENDED720pBluRayx264NeZu in Mystery	6BA6C96E0D91D98BB4DF18C41B92B7435E50A9D	11/9/2016
73.109.59.21	Within2016HDRipXViDETRG in Thriller by ETRG	48619A03140A44B144FB915DD076CB0446A6E1E5	11/9/2016
73.109.59.21	Creed Nascido Para Lutar 2016 1080p BluRay Dual Audio Dublado	139F7CDAE49CBACE1D811DABC537C7815BC06A61	12/19/2016
73.109.59.21	1Doctor Strange 2016 HDTs x264 AC3CPG in Action by Silmarillion	13A27BDB9848A2E90514D5E6CC4E70F57E0AD11F	12/19/2016
73.109.59.21	Max Steel 2016 HDRip XViDETRG	6951CFEFB77926A5BEC5A341FFE1D4DF7664919E	12/19/2016
73.109.59.21	Collide2016HCHDRipXviDAC3EVO	A333C94556632FF6C617DAE8C52FE006925014FE	12/19/2016
73.109.59.21	Barry 2016 HDRip XviDEVO	9C2BD0D18E1D89C66C8381A80A20F048901557F0	12/19/2016
73.109.59.21	UFC Fight Night 89 WEB DL H264 Fight BB tv	1392527E78812811EF548E261036A1B2FFC15817	12/19/2016
73.109.59.21	Arrow S04E02 Dual Audio WEB DL x264 ByLuanHarper tv	1391DD9AF64A9617AD4557A7E582927081C4CEF2	12/19/2016
73.109.59.21	Deja Tunes 1 The Finest In Sunny Beats MP3 DIVXTOTAL music mp3	8E0335F45AB9AE7218AF22DBC80FAF991D2D4564	12/20/2016
73.109.59.21	Req Northstar Pop Karaoke NM2048 from BJtheDJ music karaoke	694C73E9E6E982D635BF576E5D51A5D1AB0A965	12/20/2016
73.109.59.21	Kripke Elementary Recursion Theory Applications Formal Systems 1996pdf	887F10BCBCD40799A49E00ECE9C8DB8716CC74C9	12/20/2016
73.109.59.21	Hunt Xter 20 Ep 01 Dul A[ Bl0x 720 264 LAC] Rokey	8A63396515A3F18835EA5EA93B6D45E7860FDC95	12/20/2016
73.109.59.21	America39s Army 009 Into the Wolf39s Den 2014 digitalEmpire	8DF955F9F95DA75CB746DC7D79606F819AFFD4D5	12/20/2016
73.109.59.21	NASA Technical Reports Server NTRS 20050060768 Validation of the Atmospheric Infrared Sounder AIRS over the Antarctic Plateau Low Radiance Low Humidity and Thin Clouds	1E96DADFE9EBEED71836917B4BD1C5B721E75B5E	12/20/2016
73.109.59.21	JBO 12 Alben und Mixe by Thorzeus	43E734CF3A52D4347695D93EC6B916B4753B9948	12/20/2016
73.109.59.21			12/20/2016
73.109.59.21	Wikimedia incremental dump files for Wikidata Test Wiki on October 01 2016	048917B4CBC7E821B215DE3C9149E7969A95BBAF	12/20/2016
73.109.59.21	Captain America Civil War 2016 [1080p] [YTSAG]	89925FB48CAE260801F35FB7175530BF6E5E055A	12/20/2016
73.109.59.21	HorribleSubs Naruto Shippuuden 486 1080pmkv	87F90E7CAC562E0DB9685ECC3DEA48EAD65B54CF	12/20/2016
73.109.59.21	Tank4322016HDRipXviDAC3EVO in Action	54EB18CA4CF0921B5CCBB22265A8575F12B2A387	12/20/2016
73.109.59.21	Burnt 2015 FRENCH BDRip x264 AC3 HD Workshop mkv movies highres	87B11DCC8468922C325FA74D5559F962A6E3FF3F	12/20/2016
73.109.59.21	The Scorpion King 4 Quest for Power 2015 1080p BRRip x264 DTS JYK movies highres	8C2663C5761147319302B00CCD20BDB4E9AC76E8	12/20/2016
73.109.59.21	TheSwanPrincessPrincessTomorrowPirateToday2016DVDRipXviDEVO in Animation	694F70CF38938C46D97ED75D585EB7BA5851C624	12/20/2016
73.109.59.21	Spectral 2016 HDRip XviDEVO	8E250A80E398A6DB8B3FF7134E0F0FDBD53C5C26	12/20/2016
73.109.59.21	Lets Go to Prison	8941FF0D8999A2FE05BBAC0D0CFD85E371E12D53	12/20/2016
73.109.59.21	STAR TREK DS9 Saison 5 DVD 6ISO	89A43E6FD268E2C70853357D3C2CFDF92029147F	12/20/2016
73.109.59.21	Enpass Password Manager v453 [Pro Version] premiumapkcomapk	8BF1532AD8B792E166793743ABD63BC62092715F	12/20/2016
73.109.59.21	Travelers 2016 S01E10 HDTV x264KILLERSettv	AE4D5DB980854A2425814BB00FC4C3734E41C229	12/21/2016
73.109.59.21	Case 39 2009 720p BrRip x264 YIFY	9A4E1AF364E7271F59B80FB93B65AF5A51D13916	12/22/2016
73.109.59.21	Triple 9 2016 720p [YTS Guru1996]	7540E2726720A3F1656304A886BD96D9B841B32A	12/23/2016
73.109.59.21	Sabrina The Teenage Witch	D6EB863CAE1B8457DB6497577D0B1408B5274DBF	12/23/2016
73.109.59.21	Blade Brown Financial Times 2011	8BB4C1D63B43A07B9592473218C13181367E06BF	12/24/2016
73.109.59.21	Reba Love Somebody Target Deluxe 2015 music aac	3A29C39EB7C23A2EB97CA7D5A8F7217F80837F46	12/24/2016
73.109.59.21	Nick Jonas Last Year Was Complicated Deluxe 2016 MP3~320Kbps ~ Hunter FRG music mp3	C41FC50BC7778F90A8C60EFC61F8E72422BFAB44	12/24/2016
73.109.59.21	[PersianWorld] Axiom of Choice Niya Yesh 2000 By Jamal The Moroccan	8D562BAD0887A7BEE9849B63472F38F6CFD62A86	12/24/2016
73.109.59.21	BÄñhse Onkelz vs Jesus rar	13AA3FAFCA43513BA705198DB16EC491FBFDBE82	12/24/2016
73.109.59.21	Dave Brubeck Greatest Hits 1967 Vinyl Rip	51B52C8FC481C766C1B5951EFEF83AF078AEEDD0	12/24/2016
73.109.59.21	Basic Probability Theory Dover Books on Mathematics	2E26DCA4C0CBD2A7ADE84BE7A6CFFA48B46EA9C9	12/24/2016
73.109.59.21	Australian HSC Mathematics 2 Unit Past Papers and Resources	67F3011279A1A71E2915D07355B77C2EA6BAEDE7	12/24/2016
73.109.59.21	Architecture and Mathematics from Antiquity to the Future Volume I Antiquity to the 1500s 2015 pdf Gooner books ebooks	46A0284D7A047DADDF32CB8B794665AECB214A61	12/24/2016
73.109.59.21	[DJVU] [2006] Discrete Mathematics and Its Applications 6th edi	3F5DD7FE8D194CA991E9103663BF683883684E0F	12/24/2016
73.109.59.21	Poker Betting Secrets Pokbs Free Plr mrr rights Article 2016	A4DEB5427AA5B4D7F86383DFE23EB8E8FC7FE884	12/24/2016
73.109.59.21	Basic Mathematics for College Students in Ebooks	DEC3729DC13D3CCB4EFF9ACA0DA7CDC61B61045	12/24/2016
73.109.59.21	Advanced Engineering Mathematics 9th ed Erwin Kreyszig Wiley 2006 books academic	09FA99455A6165D0F44B3290ABC93DFC87E20E84	12/24/2016
73.109.59.21	Custom PC October 2014	A9C1BF39B661F984806129FCB418DC0B73126AC6	12/24/2016
73.109.59.21	A History of Greek Mathematics 2 Volumes Dover 1981 by Thomas L Heath [DrSoc] in Educational by DrSoc	D6B8CA99337FEB88A4C5F6456FCDEE5BD05C4216	12/24/2016

73.109.59.21	History of Greed Financial Fraud from Tulip Mania to Bernie Madoff 2010 by David E Sarna [DrSoc] in Ebooks	5C05FBF21B4E8B78E2CEA0F3612D74CF1C1D0A30	12/24/2016
73.109.59.21	I Am Bolt 2016 1080p YTSAG	453B31AE3081820D80F6387074EB1CFF4615D9F1	12/24/2016
73.109.59.21	The Best Writing on Mathematics 2015 2016pdf Gooner	F945293A1F5AE32E4D7DDB49A4A43D241726BD0E	12/24/2016
73.109.59.21	Passive Income 30 Strategies and Ideas To Start an Online Business and Acquiring Financial Freedom 2016 [WWRG]	7B31D51324D2259D8240B4597E31130E7E5E2F6B	12/24/2016
73.109.59.21	320 kbps from MusicStream torrentStartingâ€¢ You need BitLord Get it from BitLordcom	A5130A6A64C69D98B60D986A0D33A0329BD00C6C	12/24/2016
73.109.59.21	Maple 11 Harnessing the Power of Mathematics	977F6D3653DEDE821D1DAD11F1615A82942BB3F0	12/24/2016
73.109.59.21	Financial Analysis Analyzing the Top Line with Excel	CF77CDB8877FD7156A5ED64B7356AF2261C06D2C	12/24/2016
73.109.59.21	Mathematics	A3EA6F63BB953893D9A2EC0FB877679DEE4ACD99	12/24/2016
73.109.59.21	Bastion 12 [AppCake]	A822CA28086AF9FF5FD6EDF043A9F55112887819	12/24/2016
73.109.59.21	Bitdefender Antivirus Plus 2014 17150682 from Software	5403E9718481537495D8BE63F84B16FD2B8D63BC	12/24/2016
73.109.59.21	The Wealthy Spirit Daily Affirmations for Financia	EDD57689EBC49BFA3FFE77EB59328229C6DCB8EB	12/24/2016
73.109.59.21	Divided Multitude2015Divided Multitude from MusicStream torrentStartingâ€¢ You need BitLord Get it from BitLordcom	2D6636571CFD81DF599F509F70BAC49DEC2083DC	12/24/2016
73.109.59.21	Microcosm survival of cells v23	ADC9A1DD6A4C91F72461E5A1E7D84E18C76B2278	12/24/2016
73.109.59.21	Ashampoo WinOptimizer v140002 Final	710EB9720E3C823ADB80128E7ED5FEAE6C57C2	12/24/2016
73.109.59.21	Os Cavaleiros do Zodiaco Saga Torneo Galactico Episodios 0108 19861989 1080p BluRay Dual Audio Portugues JapaneseWolverdonFilmes [Sawlyn]	11C4A7CD2DD356E2E0F4E40E194C3CD42B08A839	12/24/2016
73.109.59.21	Mision Secreta Extraction	475A9F860E2146D1DA4BC18572619D8318637434	12/24/2016
73.109.59.21	Lamhe 1991 Hindi 1080p Blu Ray x264 DD 5 1 MSubs Masti movies	C15EE5D71C16F8911CD702E5D0DB6FF40C27C795	12/24/2016
73.109.59.21	Rudolph Valentino The Four Horsemen of The Apocalypse 1921 tintedAVI	28CB18854C9F3DAB8911C35F34404C3E03E9A47A	12/24/2016
73.109.59.21	The Human Centipede III Final Sequence 2015 WEB DLrip	5668F2D9353931414FB60B21503DE9BED1B799BA	12/24/2016
73.109.59.21	Johnny Clegg Joan Baez Third World Child Live Nelson Mandel	976CB2C76E955A4114C039C1E645895E8FD7C1FD	12/24/2016
73.109.59.21	Fantomas S01E08 Misterio Africano by BR	84E0667AE5380BB510DC07D3E5FFBADF8357FD4	12/24/2016
73.109.59.21	Port Protection S01E10 Looking for Blood 720p HDTV x264 DHD rartv tv	4DFE42CC0241220E9106FEE83A22097BAB380B37	12/24/2016
73.109.59.21	Castle S07E06 720p WEBDL DD5 1 H 264ECI[rartv]	1F322FD5378496EAC79FF2803919065F4A77DD83	12/24/2016
73.109.59.21	FameHigh2012720pHDTVx264BATV [PublicHD]	34826DBFB456CF92B02DF06C47A459DF705EB114	12/24/2016
73.109.59.21	Math Tutor DVD Engineering Mechanics Statics Volume 2	8ADA66B09A16B8D3479BD37ECF055F1C322BBB75	12/24/2016
73.109.59.21	Zoombies 2016 [1080p] [YTSAG]	E47E61891BD657074758421059FED8E942C3C73D	12/28/2016
73.109.59.21	Sully 2016 1080p YTSAG	1581F09B4A26C3615F72B3B932627F58BD6DD9F0	12/28/2016
73.109.59.21	USS Indianapolis Men of Courage 2016 720p WEBRip 900 MB iExTV in Action by iExTV	6031860C3CE876053F329D761B25CCE37E8E7217	12/28/2016
73.109.59.21	Nocturnal Animals 2016 HC HDRip XVID AC3ETR	9FDF811A2D2D2641AB3ABAD294917F2BAA7D7F84	12/28/2016
73.109.59.21	Trespass Against Us 2016 720p SCREENER H264 mp4	EF89729CF79D5D124BC3B45C37F2A7A557F26010	12/30/2016
73.109.59.21	TrespassAgainstUs2016720pSCREENERXviDAC3	AAD767ED5D1D25657477F4EAE6D6BDFC7F9A2FF6D	12/30/2016
73.109.59.21	Criminal 2016 1080p BluRay DTS x264ETR	1A394891902FA5D4A05382A31A2D00A032C8517E	12/30/2016
73.109.59.21	The Hollow Point 2016 720p WEBDL 900MB ShAaNiG	1C4DC36DC18A258154EBE7C7327B03C871D0457F	12/30/2016
73.109.59.21	Midnight In The Desert 06152016 FS Grid Down Scenarios	1E961B2ED09E2474F424E5AF31924267CF410336	12/31/2016
73.109.59.21	[katcr]eurotripcontinuumeppv01pradyutvam2cpul	1E3CA9AC709022F21E8186B2094C215DA12F3478	12/31/2016
73.109.59.21	JK2015 2015 MP3	A976E681E4A55D486DB48A0432828998A2048D0A	12/31/2016
73.109.59.21	Chillz zip	1EB917CC0E463A7828BE6FDEA51A07196319E649	12/31/2016
73.109.59.21	Na sou pw mia istoria Jorge Bucay	1EA99408122695DDAC4666B54DFE9997140D57B0	12/31/2016
73.109.59.21	Living Simple Free amp Happy How to Simplify Declutter Your Home and Reduce Stress Debt amp Waste books ebooks	1EB1D2463312BBE388A85B174DDDFB55CA7FEDF3	12/31/2016
73.109.59.21	State Dept cable 1977133538	1E8A7FC70D77A70A4956FC6084C5710A0A0F9BD6	12/31/2016
73.109.59.21	Acupuncture Therapy for Neurological Diseasesa Neurobiological View PRG True PDF pdf books textbooks	1DD38DF56B904E65F6F7A2EDD2EED11AC52F7C35	12/31/2016
73.109.59.21	NBA 2K17CODEX MAC OS	1EA3F465A04FBD8B6D8A2AACCEE3D7854C5A46531	12/31/2016
73.109.59.21	320 kbps from MusicStream torrentStartingâ€¢ You need BitLord Get it from BitLordcom	1EAD6E2D2AE39DD4638549E8DBEBF464EB240144	12/31/2016
73.109.59.21	mide256 chat acme the first time in anal Nishida Karina	1E8142A5E9B4F4A3629101075D61CD90417734E2	12/31/2016
73.109.59.21	Monsters El continente oscuro SPANISH ESPAnOL HDRip XviD NEWPCT	1D84A5D04525E3C72F0DA3305457C3ADD261A6B1	12/31/2016
73.109.59.21	Sanremo 1965	1DF5417FA66807C98E6416CC067A2E53249A17A4	12/31/2016
73.109.59.21	Microsoft Excel 2013 15 0 4779 1002 win	1E1FD230FBF3D65D869F5494CD80C81D88BD416E	12/31/2016
73.109.59.21	Ryuugajou Nanana no Maizoukin anime	1E1B9B6086989CC0199E3A3D20505E37A3EF3FFA	12/31/2016
73.109.59.21	Hacksaw Ridge 2016 HDCAM x264 AC3TuttyFruity in Drama by Silmarillion	8290E41F0367AB51EFDD6ADB485828F77F05E702	12/31/2016
73.109.59.21	Batman v Superman Dawn of Justice 2016 EXTENDED HDRip XVID ETRG movies	A9782670D6546DEAE3C06EAA004457CFDB72F6F	12/31/2016
73.109.59.21	Entourage 2015 1080p BrRip x264 YIFY in Movies Other	1EAFE30A79476CC7176ECA03D8E03536DA32EA06	12/31/2016

73.109.59.21	Fit To Kill 1993 DVDrip XviDFiCO	1EC6543A36ED69608AE31CB08F8381BB763E7304	12/31/2016
73.109.59.21	BadSanta22016READNFOHDRipXviDAC3EVO in Comedy by S	1EC75E74F040F7FA8B54F340B6D21A4F7301B5C2	12/31/2016
73.109.59.21	The Walking Dead S07E08 HDTV x264FUMettv	392D45C62042263A84D4D7A8671E96B0E9C2146B	12/31/2016
73.109.59.21	Banshee S04E04 HDTV x264 KILLERS ettv tv	1E6B5DF8090109080F48020D2403EB2EA58F07C1	12/31/2016
73.109.59.21	PBS Nature Natural Born Hustlers 3of3 Sex Lies and Dirty Tricks 720p x264 HEVCguy mkv tv	1EBE3A1AD35CA96D25AC5127B11A85734094ACCA	12/31/2016
73.109.59.21	True Detective Season 1 720p BluRay x264 ShAaNiG	6CCACFFC8C8F0839A0E610AF223786071808C7CF	12/31/2016
73.109.59.21	01 Downtown feat Eric Nally Melle Mel Kool Moe Dee amp Grandmaster Caz mp3 music mp3	3B5A5C7658801E1F2E3C686CBD7D5B849B969A1	1/3/2017
73.109.59.21	The Accountant 2016 1080p BluRay x264 DTSJK	61CDC85BB6330327585B7CB979D9B339A6558014	1/4/2017
73.109.59.21	Sugar Mountain 2016 1080p WEBDL DD5 1 H264FGT	E2EC9C9CDC4EA8C93D0A64A36907CFC31A1273B5	1/4/2017
73.109.59.21	Eye in the Sky 2015 1080p BluRay 6CH 18GB ShAaNiG in Thriller	25622325AB9C8594F1D83A2BCF8A813C5B2AA847	1/4/2017
73.109.59.21	KevinHartWhatNow2016720pBRRipx264AACETR 1000 in	D5B8A46D17FCC74FF5C339562D69F681D174ACFD	1/5/2017
73.109.59.21	Jack Reacher Never Go Back 2016 HC HDRip XviDEVO	91353F45AFFBC80E9DAB1A802314FC5109175DB9	1/8/2017
73.109.59.21	Mike and Dave Need Wedding Dates 2016HDCAMUnKnOwNHiveCM8 in Adventure	5172EDF9767CC6FFDB73CC245EA10AC5FE6D973B	1/8/2017
73.109.59.21	1CoinHeist2017HDRipXviDAC3EVO 1000 in Drama by Si	3358FA3C52BB3F3769306412B5FBC1F4A62520DE	1/9/2017
73.109.59.21	HellsKitchenUSS16E11HDTVx264FUMettv in Other by et	97085068A5EEDF1D3850EC03277C3EC97E15D728	1/9/2017
73.109.59.21	HellsKitchenUSS16E12HDTVx264FUMettv in Other by et	683DA0CC7F7930FB8DE21F6B8C9B3BD5982AADA	1/9/2017
73.109.59.21	LeahReminiScientologyandtheAftermathS01E06WEBRipx2	8EF4A52F10F42D06843E3EAA908706A220C9CBEA	1/9/2017
73.109.59.21	LethalWeaponS01E10HDTVXviDFUMettv in Other by ettv	52281D2844D54A8CAB9DAFC1AD6A4852EB0E0A62	1/9/2017
73.109.59.21	IndependenceDayResurgence2016HCHDRipXviDAC3ETR 1000 in Action	A6452CEC921F97A12699F4460FE74A5EADF19E9	1/10/2017
73.109.59.21	Keeping Up With The Joneses 2016 1080p	565D16805EBFA78C7A4DE33E33A22647D8001EEC	1/11/2017
73.109.59.21	1Microsoft Windows 10 PRO FULL x64x86 Sep 2015 [TechTools] in Windows Other	13CE4165780324CAA56EA59878D64215E2DD4040	1/12/2017
73.109.59.21	1KMSpico 10 2 0 FINAL Portable Office and Windows 10 Activator [TechTools] in Windows Other	F925B5BA9A9BCE6CC44F354A5931FC323EAA4CAA	1/12/2017
73.109.59.21	[AnimeRG] Toaru Kagaku no Railgun Season 1 Complete [Eng Dub] [720p] [ScavvyKiD] in Anime Other	BF70C943E87439C7C9BE738302030F1C45577168	1/13/2017
73.109.59.21	1Trolls 2016 720p WEBDL 850MB ShAaNiG 1000 in A	E9F0B6B36BEA84B43C6BCEB82BBECF3D21C3A3C2	1/15/2017
73.109.59.21	Cashback 2006 BRRip XviDETRG	F7E34AAB1E7CF676A890C7C84AEB5093E331E9BE	1/16/2017
73.109.59.21	PatriotsDay2016DVDSCRvidAc3DiNGO	93BF848C4B4D89E77452A7CD07783C0B0DCF2FF5	1/16/2017
73.109.59.21	The Mick S01E04 HDTV x264LOL	32E4FA2A90308AA84991CD587833585CE5A3184C	1/16/2017
73.109.59.21	The Girl on the Train 2016 1080p BRRip 1 6 GB iEx	57D3FD1AB999B91668413318D38B7C9D23EB2178	1/17/2017
73.109.59.21	Billionaire Ransom	F5C4B7E9EA84127882F7D5CFE6773C7643AB5EB9	1/19/2017
73.109.59.21	The Girl with All the Gifts	748C127ED2E05654F61CFDF9905DA77D45EFB615	1/19/2017
73.109.59.21	Gernika	BFBA7EC3B49E155F52668C9EC70013D9A37E15FD	1/19/2017
73.109.59.21	The Big Bang Theory S03E18 720p HDTV x264CTU	77875678F7FE5018616F673052390BB447AD6702	1/24/2017
73.109.59.21	Luke Bryan Crash My Party Deluxe Edition 2013 Country 320kbps CBR MP3 [VX] [P2PDL]	26510BA8FF1AAF8E8FAE878B5BB150DDCC940E6E	1/25/2017
73.109.59.21	Bruno Mars Album Discography [MP3320kbps] theHH	6B2CE91FF96E9344F8FE8D8BB8AA11A1D8646995	1/25/2017
73.109.59.21	MonsterTrucks2016HDCAMUNKNOWN	6355FB70FF316EAA91FE476A142F21B8C43D4A41	1/26/2017
73.109.59.21	Dancing in Jaffa 2013 BRRip XviD	089F4AE7F58BE05D74ADFF3AFECAC36D13F3BF	1/27/2017
73.109.59.21	Yuridia Soundcheck WalMart Acustico 2008	E6061A6EE5439AD5FB43856E5EAC976643D7F6C4	1/27/2017
73.109.59.21	WinRAR 64 bit Final	9A613817DD6C2E7256F31C7E23AD7EC64329C4C4	1/27/2017
73.109.59.21	YG Still Breezy Deluxe 2016 MP3~320Kbps ~ Hunter FRG music mp3	D280E88355D049E06AFDC7A85CCF0C4C71B5F7F5	1/28/2017
73.109.59.21	Skyfall 2012 1080p BrRip x264 YIFY	188AA63C64E1D6B64B74F5BE36CB9244C08A3456	1/28/2017
73.109.59.21	Wild Hearts 2006 Eng Hallmark movies mp4	C870A32F0CDA975D62BD5DE095319AD288E5244D	1/28/2017
73.109.59.21	The Accountant 2016 720p BRRip x264 AACETR 1000 in Action	D096FF66557A5EA7030680967610E38B37434EA8	1/28/2017
73.109.59.21	Transporter 3 2008 1080p BrRip x264 YIFY action movies h 264 x264 video hd	C3806F45C8BDCASEE13C15C527C6564157B3522D7	1/28/2017
73.109.59.21	Mad Families 2017 HDRip XviDETRG	74EA35EE7B21E16E2E26D2A88DAE677934A96E0B	1/29/2017
73.109.59.21	JenniferFallsS01E02720pWEBDLAAC20H264ABH[rartv]	4AD29680716388D42028BEB7F0722A0EAC269E61	1/29/2017
73.109.59.21	The Grand Tour S01E10 720p WEBRip x265 HEVC 325MB	7812C33935B06584FDD7B5693E10921C17FE0973	1/29/2017
73.109.59.21	2Keeping Up with the Joneses 2016 1080p WEBDL x264	2AAB225A4AEAC19D7B41DF486A5752BC550931B1	1/30/2017
73.109.59.21	Titanic 1997 Bluray 1080p DTSHD x264GrymBTNET	B8E15F5570B8D9D68FF08F2D185CC08F851469A8	1/31/2017
73.109.59.21	JohnWick20141080pBluRayAC3x264tomcat12[ETR 1000] in Action	0215282D2B867B2A038052B7AEFE68326D02A8BA	2/1/2017
73.109.59.21	Volbeat The Strength The Sound The Songs	8DD7F33C2A2C7FAFC0EE360AEF2EDAFBE7867D4B	2/2/2017
73.109.59.21	HiddenFigures2016DVDSCR2P	5C373C4818CE2B1BFC6F77A3646D6712CC1DEDC4	2/3/2017
73.109.59.21	Fences2016DVDScrXviDAC3HQHiveCM8	1AC03A4E2071B2D9FAA6998BBAE3CF0AD92F902BF8	2/3/2017
73.109.59.21	Blair Witch 2016 BRRip XviDETRG	9DC71EA08B0CC83711DB877472BB4CC67716CDE5	2/3/2017
73.109.59.21	Deepwater Horizon 2016 HDRip XviD AC3ETR 1000 in Action	07FD285EEA22E66DB77C658854850FEA1F7603BD	2/3/2017
73.109.59.21	2KeepingUpwiththeJoneses2016720pBRRipx264AACETR 1000 in Action	B3FA69CBDA8A63F0E48BFC595B971BE2F17C715FF	2/3/2017
73.109.59.21	The Accountant 2016 1080p BRRip x264 AACETR 1000 in Action	C18E4A7B06A46E2F933D0DAC12936AD1B1CD2742	2/3/2017
73.109.59.21	Storks 2016 BRRip XviDEVO	B40FD91913D564FDC2D3B747B8E6F35B84E3D0E	2/3/2017
73.109.59.21	AtlantaS01E04HDTVx264KILLERS[ettv] in Other by ettv	574F8B463A6FF56E6CEB0CF72286DB7A3AD22D45	2/3/2017

73.109.59.21	Jack Reacher Never Go Back 2016 YTSAG	6BA528A60AB22E9F037611693356211BB9AA76E8	2/4/2017
73.109.59.21			2/4/2017
73.109.59.21	PetesDragon2016BDRipx264COCAInmkv in Fantasy by bone111	11F7254F4439E42B5DDA858BD908D1AB1563F120	2/7/2017
73.109.59.21	RePack by KpoJluK v201603 from Software	1964B9ABE1A685F4A47FCABC7A9FB7F1A9973098	2/8/2017
73.109.59.21	Criminal 2016 720p WEBRip x264 AAC ETRG movies highres	92453EE2E12CF8F793403C26005084D4BBA1563	2/8/2017
73.109.59.21	Dallas Season 02 [Complete]	F878E6B7794DB3B2812DFCD7001DA41F3505656C	2/8/2017
73.109.59.21	Far Cry PrimalCPY	77FA2AC88F98D67F294049147B50B43E1666478E	2/10/2017
73.109.59.21	The Witcher 2 Assassins of Kings Enhanced Editon SKIDROW games pc game	F07C210F78344996DABCB130FF28B35963BA698C	2/10/2017
73.109.59.21	Skiptrace 2016 720p WEBDL x264 Eng Subs [Dual Audio] [Hindi Cleaned 2 0 English 2 0] Exclusive By =Dr STAR=	250DBDDE35636C6B5DD157C74BC82AB111D7E8A5	2/13/2017
73.109.59.21	White 2016 Malayalam DVDrip 1GB x264 AAC Esub Chaps	C68985FC6B7A7F2ACA219343CD6D76BDD241E04D	2/13/2017
73.109.59.21	BloodFather20161080pWEBDLDD51H264FGT	1C74B4CDE890FC95BE77AC253297C45E50A05F98	2/13/2017
73.109.59.21	Mechanic Resurrection 2016[Real DVDScr [Tamil Real Line Au	87EBD53DAF8D1B9292F6739C790205EBBF89B2C9	2/13/2017
73.109.59.21	Jack Reacher Never Go Back 2016 HDTs x264CPG in Action by Silmarillion	E55DF583E4F8752E9E4AEB71F67A17FBF6983C68	2/13/2017
73.109.59.21	PopstarNeverStopNeverStopping2016720pWEBRipx264AACETRg in Comedy	3DFA9AEF712464D0CC497A54F0C067C1831E070C	2/13/2017
73.109.59.21	When the Bough Breaks 2016 HDCAM XviD UnKnOwn in Drama by UnKnOwn	FC0B5E2B8910A1B226A379CE6192632981E9627C	2/13/2017
73.109.59.21	Project X 2012 EXTENDED 1080p BrRip x264 13GB YIFY	2D8151573ED3D6FFC3EB5C28C3925AF4AF2CD1FC	2/13/2017
73.109.59.21	Arrival 2016 HDCAM x264 AC3TuttyFruity in Drama by Silmarillion	39E55517C2B599F5ECA6FC6C7927588D8ABA213A	2/13/2017
73.109.59.21	Teenage Mutant Ninja Turtles Out of the Shadows 2016 720p WEBRip x264 AACETRg	82D59FBB29EC43F27AD3630AD5D8F696B7268746	2/13/2017
73.109.59.21	Sneaky Pete S01E05 WEBRip X264DEFLATEttv	9D746BD5EC0DB0FA75E3EEAAF3D918F07CFC7C87	2/14/2017
73.109.59.21	Showtek Fuck The System WEB 2010 [hardstyle]	39C26720DF06E7199A99F27F2AABA165A8BE01A5	2/17/2017
73.109.59.21	Mens Fitness UK Military Fitness Speacil Forces Training Plan Mag Book New 2014 True PDF	F9D1B445DAFC5E5CB1ACFE507A0BA8BFD9DE08BD	2/17/2017
73.109.59.21	The Big Bang Theory S10E16 HDTV x264LOL eztv	E92C36040BA77E2EE8D572915BCA27D66A1ECB01	2/17/2017
73.109.59.21	La La Land 2016 DVDScr XVID AC3 HQ HiveCM8	CCFA6A813321A33F0E6DB0ADD7C1B3E1A961B86B	2/19/2017
73.109.59.21	Pulp Fiction 1994 1080p BrRip x264 14GB YIFY	3F8F219568B8B229581DDDD7BC5A5E889E906A9B	2/19/2017
73.109.59.21	Spectre 2015 1080p BrRip x264 YIFY movies divx xvid	65A2EB30886F99522FA672FCA08C999F0611C591	2/19/2017
73.109.59.21	Moonlight 2016 DVDScr XVID AC3 HQ HiveCM8	E7CFB8949BB6A10E58E415EAE09971585770595	2/19/2017
73.109.59.21	PJ Proby Music	48CE25709D5E0671F0A3B53C627E6960FCE62E6B	2/20/2017
73.109.59.21	Dj Nobody The Best Of Beanie Sigel	18077FCF90A5FC30D5D456FEB5A8F70CA9AA3706	2/20/2017
73.109.59.21	Lights Ice [Single Edition 2009]	07D9A629C8E156FC4F0DA9DB99ABE36EAB8E4793	2/20/2017
73.109.59.21	Muscular Development ? May 2015HQ PDF	26325FE8ABF4A64DE85ECA91583A6E9F49ACCE82	2/20/2017
73.109.59.21	MSNHackexe	52697F99B1FD360398CDF5B85CDC89F2BAF5C218	2/20/2017
73.109.59.21	Cream Machine 4 adult	26AB8E7AF95B46A6452D5381230FFDAD31CC8D60	2/20/2017
73.109.59.21	SpringerBriefs in Environmental Science [Updated at 20161118]	3A23483477B43602FAECFF478EED77F88858AFB	2/20/2017
73.109.59.21	REFLEXIVE Ancient Tripeaks FULL	3763197DC41638AC3D84FBB1FFA3F0DFE070D33	2/20/2017
73.109.59.21	Nicolas Rada Landing 320 kbps shailab	3C4D91C3A848AD869090D046BCC8F1DFB542D40C	2/20/2017
73.109.59.21	Toon Boom Harmony Premium 1211 Mac OS X	685071A1412ABF3FC6141A034EF541EFF9E26348	2/20/2017
73.109.59.21	Lecrae	24B895029DA64EFEB21FE9932A6B23F1DE3D139F	2/20/2017
73.109.59.21	Garrys Mod v140908 Full +Auto	1AB99E80DD135FB19722FEA250F86A4B5A1887AE	2/20/2017
73.109.59.21	Shutterstock Vectors	2D1D4B6827EDDBA683C9D5B1D3E1B32E2A30B31	2/20/2017
73.109.59.21	Wild Season Episode 1 PROPERPLAZA from Games	3C80A8C2F122F46C03180BA96778E48E890CCEA8	2/20/2017
73.109.59.21	Windows Vista Activation 2008	3B1C52EBD6CABBAE63E2C8FF5E1AA473C068EF8F	2/20/2017
73.109.59.21	SimCity 2013OfflinenoteTEAM	3DE4F4AA43128E2590C545D517F52641B3B5E7F	2/20/2017
73.109.59.21	Gatling Gears [Arcade Shootem up 3D]	3E2B7D0A12FB2D4152AC371090A8CD035E70D3BC1	2/20/2017
73.109.59.21	Punch Club The Dark Fist MULTI9 ALiAs games windows	3B1AE68422B427C50D93B7135159769C595BD606	2/20/2017
73.109.59.21	Microsoft Toolkit v 253 full Official	6335A5CC48F68C7AD61DD4BADBC1BB912A865165	2/20/2017
73.109.59.21	WinRAR 520 Final x86x64 Incl Key by PoKeRaLhO	5FBADEFB9276BE75D6CC61E40C36FF069D0D5D27	2/20/2017
73.109.59.21	anivertAir TV	2EE68A05FA03F1007FA13FE8CF50123F8F3FB9D0	2/20/2017
73.109.59.21	UJin Midarashi Dango ~Boku no Hajimete Ubawarechat	64F826AFC5ACEF1E696B00B3206F5683FFF4E5E6	2/20/2017
73.109.59.21	Cop Craft Vol 0104 40 010441	689D779EACD331F7177EBEAFCF94E89631B89F7C	2/20/2017
73.109.59.21	Flicki% 201612æœ°ã	27377CCBF291AE879E7FF7C2A3070189B28924AC	2/20/2017
73.109.59.21	Un rayo de luz 1960 [HDrip][Castellano]	0816B9298EAB09E6ADBEDFEAA7BF20CE4AD10D1F	2/20/2017
73.109.59.21	Asesinato en el Piso 13 [BluRay Rip][AC3 20 EspaÃ±ol Castellano][2013]	0C37A11F1741E3EE7BA3B53DCDF0D027B27AB5F5	2/20/2017
73.109.59.21	Godzilla 2014 DVDrip XviDMAXSPEED	6215FC7D27211D910CEB28D8D2CF3851B280DE3E	2/20/2017
73.109.59.21	Tri korolevyHDTVripGeneralFilm	6A01CC6532492E5C0031AAF3C9E7AAF1365FA08D	2/20/2017
73.109.59.21	Game of Thrones 6x09 La Battaglia Dei Bastardi ITA ENG 720p WEB DLMux H 264 Speranzah mkv tv	63F460E25A79EA9B395AE43C39202BFFE337D023	2/20/2017
73.109.59.21	Basketball NBL 2015 16 Melbourne United Vs Sydney Kings tv	55CA63942591BC6161ADA121FE07B1FB4291D629	2/20/2017
73.109.59.21	The Tudors Complete First Season	237B98D8D5E4681369E6B204A0ADABD6567F3CE2	2/20/2017
73.109.59.21	American Dad S12E07 HDTV x264FLEET	D810916586229CC30FF29C2637595901CA03A00B	2/20/2017
73.109.59.21	In Your Eyes 2014 720p WEB DL x264 AAC Ozlem movies highres	1E6AF10491DD9F3EE50FD985F383003F3CBFE46B	2/21/2017



73.109.59.21	Kevin Hart What Now 2016 DVDRip XviDEVO	E12B7A78558CACAF37E3F08D43F2442FADF99277	2/22/2017
73.109.59.21	Check Point 2017 720p BRip x264 AACETR	DFBD752E49ABCA81461C046080F42D82346A997A	2/25/2017
73.109.59.21	Spanglish 2004 1080p YTSAG	6AB643784F636EF77F0D1751549A4552CF27D3B8	2/26/2017
73.109.59.21	American Violence 2017 HDRip XviDETRG	C130A0492A5014093AE0EA43480BE0CA86B62214	2/27/2017
73.109.59.21	Boo A Madea Halloween 2016 1080p YTSAG	33D7442CDD6462F9A8901579649531142A62E153	2/28/2017
73.109.59.21	Bad Santa 2 2016 1080p YTSAG	F2BEA1C4445C9182C2748102F013675DA4D27430	2/28/2017
73.109.59.21	Star Trek The Next Generation TNG Full Series 720p BRip EN SUB x264 kris33 tv hd	59D64C03AE4ADD96B0703F5C2DBEF002414E4E34	3/1/2017
73.109.59.21	Inside Out 2015 HD TS XVID AC3 HQ Hive CM8 movies	A6E8D9BF1DA5678B454B8BF52C2429439CD247A	3/2/2017
73.109.59.21	Furious Seven 2015 1080p BRip x264 YIFY movies highres	1FC5BFFF2D39A97FE4A622C5B76D28A276CF2D8A	3/2/2017
73.109.59.21	Silence2016HCHDRipXviDAC3ETR	71460942ADB2A3B582DEACDC9BC05BFAEC366343	3/10/2017
73.109.59.21	TheNightWatchmen2016DVDRipXviDETRG	15F053D830A024974A4A6E9F510C4E5A47C8A1A1	3/10/2017
73.109.59.21	KCi My Book 2006 RB	1C51DC449A983EB72B42854944160D1B32638716	3/11/2017
73.109.59.21	xXxReturnOfXanderCage2017HCHDRipXviDAC3ETR	4582A3EC8AF005AC24016DD2CC61BABAC30CD69B	3/11/2017
73.109.59.21	The Ones Below 2015 HDRip XviD ETRG movies	8B780CADB18AA6665F4476C3BCDD2ECF976336DC	3/12/2017
73.109.59.21	TheGirlwithAlltheGifts2016720pBRripX264AACETR	67C54086CE64BEDC3C5A4AC8E5CDFA07D65C123F	3/14/2017
73.109.59.21	Moana	749E77BBFEBD97E689C132E3B663BB89425476DC	3/14/2017
73.109.59.21	Justified Season 16 S01S06 720p BluRay ~[KiNg] in Justified by Uplaoderking	33BAD561E9DCF312E00672AF55013D8B885149A5	3/17/2017
73.109.59.21	Adobe After Effects CS6 11 0 0 378 LS7 Multilanguage ChingLiu apps pc software applications windows appz	427A6A0D2BA119887708FD88DDEB56274A0B07BD	3/19/2017
73.109.59.21	2016 07 26 Sports local et rÃ©gional	A93E29BF1F58A4E37FBF90D69CB49C6204BFC1B4	3/21/2017
73.109.59.21	Ruben Roze Acoustic Jam MP3 192 VBR	98B3A093F4227E0EA1E8915E734883D749D8F4CC	3/21/2017
73.109.59.21	The Weeknd Beauty Behind the Madness Explicit 2015 MP3 Album ~ VBUc music	55C92BF000E806C70DDA0606F4AB875C85516A30	3/21/2017
73.109.59.21	Blues Rock The Lucky Dutch Cadillac Coffin 2016 Jamal The Moroccan music	65DB1CE6BC771A24AE64EBE88B89936DF012ABF9	3/21/2017
73.109.59.21	Avril Lavigne Fly for Special Olympics P DawG mp4 movies music videos	5B8A0D0650D17806F95B05EB8AF24FAD3D9E1542	3/21/2017
73.109.59.21	Infant Annihilator The Palpable Leprosy of Pollution MP3 320KB	0CDF4C173110CC153BE9757AEC7D1096474E3835	3/21/2017
73.109.59.21	Periphery Juggernaut Alpha amp Juggernaut Omega 2015	C05AC87B9886696977299AFF0682713EDE5514A6	3/21/2017
73.109.59.21	Dr Ozi Twofold â€œ Correlations EP 2014 [BGOE54] [DUBSTEP]	A9350D58D2AC126271CE33D290E6D0A79C70A94C	3/21/2017
73.109.59.21	Acid Mothers Temple Discography	85E0E475EF1C3C9C27C8C32D6BE042AC96DB58D4	3/21/2017
73.109.59.21	Seerat Wa Milad No By Anwar E Raza	B09B07D77F61C54A31522F7E76C4B88249FE789D	3/21/2017
73.109.59.21	Ragioni per la diversione ordinata dalla MaestÃ del Re di alcune acque dAirola per la regal villa di Caserta Carlo Mauri Francesco Vargas Macchia	490785B9320BF596FC1132DF7B3A4AC6FF3B0200	3/21/2017
73.109.59.21	Super Food Ideas 33 money Saving recipes +16 new Ways with mince February 2015 True PDF in Magazines	4A3FFD868CED4D4A54988869FEBDFE0404208ED0	3/21/2017
73.109.59.21	Position Sex 50 Wild Sex Positions You Probably Havent Tried	857627DD535C33060572051F97C14CCD1C76883	3/21/2017
73.109.59.21	Earth 2 Futures End 01 2014 Digital Shining KnightSCCNovusHD [NVSD]	3BFA2017C9DF1C02977324A541F14E11AB7E6641	3/21/2017
73.109.59.21	Barely 18 18 s5 with Jasmine Byrne mp4	A8CD1830F8D91708E6B352FEC4F3200BF53FDF26	3/21/2017
73.109.59.21	Graphisoft Archicad 13 x86 x64 extras NO CRACK	3279B358FBB16BCBA1C1A7F4E10770CD503774A3	3/21/2017
73.109.59.21	Paradise Lost The Plague Within 2015 audio mp3	0FC4CB45C7061A0B154916E334EDB9834E82817F	3/21/2017
73.109.59.21	The Steve Wilkos Show Did You Bite My Baby	9E440863327AE87495FF0D2627D44E7D05F0743B	3/21/2017
73.109.59.21	100 Years of Fashion Illustrationpdf	73489BFC89414233D47E4ABFD9D42BFAF9A57	3/21/2017
73.109.59.21	The Strain S01 LF 1080p	76BB8E9FCF618B08471634F69BC80DC4E0DCCD59	3/21/2017
73.109.59.21	Bryn Greenwood All the Ugly and Wonderful Things	9B0F2E66A3453AB9884E436E5D0D816EB7741B82	3/21/2017
73.109.59.21	WINDOWS XP PROFESSIONAL SP3 JAN 2015 SATA DRIVERS software windows	38E34816E47632F00FE56CBD3E14F7DC9870C0BC	3/21/2017
73.109.59.21	BaggageClaimXviDECSTASY	8AB5426B947B79C44A156B47D3A2B8AAA659EAE0	3/21/2017
73.109.59.21	Nero 7 Premium Reloaded 7751 dk	98CF968C810E4A04ED62E354BFCCFF1212EE6E	3/21/2017
73.109.59.21	ph1999120531785flac16	2253674F829A032D7E9FC6018596DE7D481F49CD	3/21/2017
73.109.59.21	Jack Reacher Never Go Back 2016 BluRay 1080p YIP	4662D673CF463EE1BF1784975867D9EDFB17F222	3/21/2017
73.109.59.21	JTBC E56161224720pNEXTmp4	943A0EB384BAF1F3B2CA71784FF943B70A29BD28	3/21/2017
73.109.59.21	Shark Skin Man and Peach Hip Girl	330E7F2BA2E49C59F3BAF84FA52FE495721A8DF4	3/21/2017
73.109.59.21	Sicflics upd19062016	81E4C3EE7A644583B70951E64664F07EE355A7E6	3/21/2017
73.109.59.21	Jessica Jones 004 2017 2 covers digital MinutemenF	0B31B87DCF07D5BA8A6985E16675D853245FAD24	3/21/2017
73.109.59.21	Beach Hut Fun BT [Cross Stitch Chart] pdf Request	93B77B13226FD59E9A3879FCE333103D6B7BDD1C	3/21/2017
73.109.59.21	Ht everyday finerypdf knitting pattern	3D5AAA480CBF6EE0C4FE7D01FF107C715B6A539	3/21/2017
73.109.59.21	Martin Hoffmann â€œ Orchester International p 1977 LP Rip	6A8C23272218DEA7CE7C3A2F55D093221D09295E	3/21/2017
73.109.59.21	The Long Dark [v 298] 2014 PC RePack	A929F2B122EFD813F5BDB28A0CB96F2E1829914F	3/21/2017
73.109.59.21	06SHE223	86F6BB237A352556440BF1B1D9B1A52742C678D6	3/21/2017
73.109.59.21	Total Video Converter 311 + Latest Crack Serial Tested Workingrar	0138AED2395A08087850668FC28DABF9FEFCAC58	3/21/2017
73.109.59.21	2220942zip	6037B6B8DDBDB3CD3AC8B51CFD0E2D02ECE6CD2D	3/21/2017
73.109.59.21	FarmingSimulator15CODEXtorrent	916A8E5630D245019266D3CC8613DD17CED22801	3/21/2017

73.109.59.21	Worms Armageddon Voice Pack Dethklok	62FEB8BD5568BD83CEE5B4AA299AD8A224F518CF	3/21/2017
73.109.59.21	LordsOfTheFallenCPY	79B534C2B6CA1D1E6F45369678A5CECE66893CA1	3/21/2017
73.109.59.21	EaseUS Data Recovery Wizard Professional 10 8 0 Mu	A9E2C9B2F9ECE8BFA12269AEBD8C8D0B8F936449	3/21/2017
73.109.59.21	Dragon Ball Z 720p HDTV PTBR Completo	1848431C87E581F9012962160AFEB95696EC464D	3/21/2017
73.109.59.21	[ExiledDestiny] Tristia Of The Deep Blue Sea Ep02 Subbed 4D12AE59[XviD Kagecode]avi	5DA805072E1112FF43C77321481E4CAC45741DDF	3/21/2017
73.109.59.21	Leopard Raws Shiobako MX 1280x720 x264 AAC anime	2E8D2D4782D8A28163024D40B919A9EDDD8AC4C8	3/21/2017
73.109.59.21	[ZeroRaws] Senjou no Valkyria 22 RAW CTC 1280x720 x264mp4	069C2D530D325C3298CD398EF0F9F05DF29FB26D	3/21/2017
73.109.59.21	Jim Root The Sound and The Story	899F2BE5BCAD22A52451B517EC64A12A424485ED	3/21/2017
73.109.59.21	Westborough Rangers Football Promo	5A4B65D0EE9182FEE592C00662D0C4575E4DE3D4	3/21/2017
73.109.59.21	Stargate Atlantis alle 4 Staffeln in dt DVDRip DivX	5F20E4F01ACDF3E14C8B988EC83E9F57FD2B3CE1	3/21/2017
73.109.59.21	Michael Jackson Thriller Full Video	4A32FCB1B1654391F182874396C26648E5B57467	3/21/2017
73.109.59.21	Pink 2016[Hindi]720pBluRayx264AVCtorrent	481A3C88AC669F6B665DFC35FF7E048760374908	3/21/2017
73.109.59.21	National Treasure Book Of Secrets ScR FS NTSC DvDRnDn net	A14C30DBD53662CD4730BDB49D77630E877B44C7	3/21/2017
73.109.59.21	Albela 1951 film	0C56CB848E70838627539F2930C831F41B9021BC	3/21/2017
73.109.59.21	Broken Trail 2006 720p BluRay DTS x264ESiR BOZX	46159735AD86DC7A63A767EF5D09BB9593AE24C3	3/21/2017
73.109.59.21	Secrets Of The Bible Code Revealed DVD	97BBB264F69E24B10499DFEBB0570052D73E3A36	3/21/2017
73.109.59.21	Airlift 2016 Hindi 720pBluRayx264NewHDTorrent	8CAE62AA1266065D7A961D65D53016D9A035E077	3/21/2017
73.109.59.21	The Onion Field Campo de cebollas 1979 [DVDRip x264 AAC]	88F57326B56469DA8EB4EBF8353ED4F165291810	3/21/2017
73.109.59.21	Riot 2015 TRUEFRENCH DVDRIP XviD Slay3R avi movies	52474E14C258505344F9B26E8064A20F475F0070	3/21/2017
73.109.59.21	Jane the Virgin S01E22 Chapter TwentyTwo 720p WEBDL DD5 1 H 264NTb[rarbg]	233A73C6B884423571CF54A6BC7D5709223C9EB7	3/21/2017
73.109.59.21	WarAndPeace2016S01E03HDTVx264RiVer[ettv] in Other	1E1F5CAEFA845D0B01C8ED2B53BAEA3BE4EE12F2	3/21/2017
73.109.59.21	3 Elementary 2014 WEB DL 720p NewStudio	A5F33D6D859569F919BD900A248DB24E6EDF0372	3/21/2017
73.109.59.21	The Big Bang Theory S10E11 The Birthday Synchronic	A97AFC1D101884EAECED22CC95548012AB80CBEB	3/21/2017
73.109.59.21	Game of Thrones 2011 Season 5 S05 1080p Bluray x265 HEVC 10bit AAC 71 Tigole [UTR] in Game of Thrones by UTRplus	5424A0CA92A624DF88EAFD60BEDA5E8FD27B1229	3/21/2017
73.109.59.21	SupernaturalS09E12720pHDTVX264DIMENSION [PublicHD]	48F8AB09D22547160FF49F11C37EB653FD5D58C6	3/21/2017
73.109.59.21	Elementary Temporada 2 [HDTV 720p][Cap209][AC3 51 Espa�ol Castellano]	35D8351037EFFEFD7116A93313E17EE1BE715749	3/21/2017
73.109.59.21	Hulk and the Agents of S M A S H S01E02 HDTV XviDAFG	56E278EE1F163787B9CD70B3D01EF1FF29FABE20	3/21/2017
73.109.59.21	Squidbillies S09E06 A Walk to Dignity 1080p WEBDL DD5 1 H 264N	540AAB27D9989F68D90277CB4DFFF564BBA64A37	3/21/2017
73.109.59.21	RegularShowS08E05LostandFound1080pWEBDLAAC20H264CtrlHD[rarbg]	9D14A3B5D10B57B5C0F3545941783B41DEF406FE	3/21/2017
73.109.59.21	Big Brother Canada S04E08b Side Show HDTV x264 tv	8F37F76F91FE50C659E9EBC8392803C9F1C200B4	3/21/2017
73.109.59.21	Friday night dinner S02E05avi	A786684565606882FB1AE0DF67F7F8EBA78CC10AF	3/21/2017
73.109.59.21	Cleverman S01E04 Sun and Moon 720p WEB DL 2CH x265 HEVC PSA mkv tv	50B6AD5E78084023C5CDD4941D2A38A3FE6D3A80	3/21/2017
73.109.59.21	TheOnlyWayIsEssexS17E14720pHEVCx265MeGusta	917D872C85995961632E69B16EC46252FE79ABE9	3/21/2017
73.109.59.21	FearFactorS06E20FarmFearFactorPDTVXviDFQMavi	1B1D4CF96E623D36AB87743E4002FF0297A0C173	3/21/2017
73.109.59.21	4 oCloc S05E09 WEB h264ROFL	00171ED1AD9A225D3310ED44A956A5E0B23F293B	3/21/2017
73.109.59.21	TheGreatIndoorsS01E08HDTVx264LOLeztvmkv	613427D43E81D0F6F7C5316BBAF3FF149A0C7F39	3/21/2017
73.109.59.21	DeadliestCatchS10SpecialSeason9Revealed1080pWEBDLAAC20H264NTb [PublicHD]	A32FED23A0C00288E182B812AD3EACC546030014	3/21/2017
73.109.59.21	The Simpsons S028E01 2016 HDTV x264 iFT	00259252144A01233660CC7779315541A97CADB8	3/21/2017
73.109.59.21	Last Week Tonight With John Oliver S03E16 HDTV x264BATV mkv	95BE06058D8B2D1A92861ED4B6A9A34DCD2A830	3/21/2017
73.109.59.21	HellsKitchenUSS16E13HDTVx264FUMettv in Other by et	19401E6FD1BD2C1B801570612B582D2BA376343F	3/21/2017
73.109.59.21	Veil of Maya Matriarch 2015 320kbps	1151A87B3692251E3FD157F9CA7F1192DF8FD937	3/21/2017
73.109.59.21	Speed Test QoS 3G 4G WiFi Prem v2 1 29 apk applications android	B0097AB38B9F3D84A16EABE9D728B1B60AD34FE8	3/24/2017
73.109.59.21	Suicide Squad Extended Cut Action 2016 Eng Fre It	DB8B62445FCE1607A12920D97C1527021F6A743C	3/24/2017
73.109.59.21	SupergirlS02E16HDTVx264LOL[ettv]	A35823D39AEAC9AC98AB1850638D7D55523B2F71	3/24/2017
73.109.59.21	Beauty and The Beast 2017 HDTS x264CPG	718A4ADE62ACC5650511B35A804B0B001D565995	3/25/2017
73.109.59.21	TheEdgeofSeventeen2016HdRipXviDETRG	E861BB718CD4DF6C41D6ADCDA6C309E13A7D4245	3/28/2017
73.109.59.21	BeautyandTheBeast2017720pHDTS950MBMkvCagemkv	A6D284DD8977D8A4F8B27D8A4A6F73A57B75D132	3/28/2017
73.109.59.21	The Boy 2016 720p HDRip 750MB ShAaNiG mkv movies	2304FCB9755DCC25CA132BD87BECEC421C47A08C	3/28/2017
73.109.59.21	Green Room 2015 1080p BluRay H264 AAC RARBG movies highres	68EB574D91ED03E7DA03DB6C717A93523FEF5433	3/31/2017
73.109.59.21	Snoop Dogg Doggumentary 2011 320kbps Snoop Lion music mp3	67921B8D0855B2D21E291CE5D316E9B26327F3A4	4/2/2017
73.109.59.21	John Wick Chapter 2 2017 HDTS x264CPG	A1C6F89B78D66AC0BE70A57A48B994A0A0587DB4	4/2/2017
73.109.59.21	Logan 2017 720p HDTS V2 x264 AC3CPG	98B40950A17AB644F155062D35DE471A933608DD	4/3/2017
73.109.59.21	The Weeknd Starboy Deluxe Edition 2016 by emi	05946DB9F53CCD4F2555BD323F44DAAE62122FB9	4/7/2017
73.109.59.21	The Magnificent Seven 2016 1080p BluRay H264 AACRA	132D78BE18F251363EB9B2D20430ED06068128C6	4/9/2017
73.109.59.21	Fifty Shades Darker 2017 720p WEBDL 950MB MkvCage in Drama by MkvCage3m95325MB	22109BA4ABD5E1D6D03638354575F4E96F995AC3	4/10/2017
73.109.59.21	2006 MP3	C814ED4CF9CA239E8FE123603FF43D39BBEC7D2F	4/12/2017
73.109.59.21	Essentials of Mechatronics	BF18B1DFD49A62A86DF6C804A3472D3F095350CA	4/12/2017
73.109.59.21	Smurfs The Lost Village 2017 Cam AVC AAC HC Subs IcTv Lottery	BF19063DC3302F88B7335ED16442F006D62B9B5B	4/12/2017
73.109.59.21	AtlantaS01e01101080pITAENGDLmuxH264sp54321	D0B069669DA0B11DFA911821F65807225E707836	4/12/2017
73.109.59.21	2 Broke Girls S06E10 HDTV x264LOLettv	FFF473B1F8FBC116BCD874CB1BB1C498D5187E4	4/12/2017

73.109.59.21	2 Broke Girls S06E11 HDTV x264LOLettv	6D172FDF17D644619C5D2ADF45EDD7DB9655732	4/12/2017
73.109.59.21	2BrokeGirlsS06E09HDTVx264LOLettv in 2 Broke Girls	6A10AFF9068AFEAAA22A9CE6FA40E622013A7EA	4/12/2017
73.109.59.21	2 Broke Girls S06E12 HDTV x264LOLettv	C0F6B9F6A634B2E28511CEBCE19D13EB18AF6574	4/12/2017
73.109.59.21	Supernatural S12E15 720p HDTV X264DIMENSION[rarbg]	C8168390C0924B9C45E6F2649403F9B968946778	4/12/2017
73.109.59.21	Self Reliance Illustrated Q2	10A6B460BF625CEDF2D543B02039A6821260BCE0	4/13/2017
73.109.59.21	Brockmann Suzanne Troubles shooter 0 5 16 5 books fiction	E0DB378F99ED386E554BF28C3359D52114898D16	4/13/2017
73.109.59.21	Ward13PeterCornwellDVDripavi	0AB5651DE0AFC4FB1C2F76477E370563714ED44B	4/13/2017
73.109.59.21	VMware Workstation Pro 12 1 1 Build 3770994 Keys SadeemPC zip applications windows	62D09DD677919A976FC94D6832937A05793AA1DE	4/13/2017
73.109.59.21	Adra Machan Visilu 2016 720p HDRip x264 1 4GB Tamil mkv movies	11599AE21E74B735E220C4E8A2EE587CB9B761CF	4/13/2017
73.109.59.21	ImpostersS01E04HDTVx264FLEET[eztv]mkv	11AFC54069E530C35604973A56301FE8AA98F1A5	4/13/2017
73.109.59.21	The Get Down Season 1 Complete 2017 720p WEB x264[MULVAcoded]	13CAC2B9EED2022A863136792D52C76D105D2C1E	4/13/2017
73.109.59.21	Microsoft Excel 15 14 0 Mac OS X	B887C3E6E9607D425E1B633B4955CE4F309731EF	4/15/2017
73.109.59.21	Black Label SocietyCatacombs Of The Black Vatican[Deluxe Edition][MP3 320][TX]	52B1AD0F858C4A788C60672B84DA7D9E05383CAC	4/17/2017
73.109.59.21	Ballerina Leap 2016 1920 x 824 x264 Phun Psyz	C8175B1F362B5E3E0682F2A3AD91F0B9843290A5	4/17/2017
73.109.59.21	Modern Family S05E11 HDTV x264EXCELLENCE[ettv]	EE97B8B9EEBEE43E8AD0AA6222B345E56190D22A	4/19/2017
73.109.59.21	Modern Family S05E14 HDTV x264EXCELLENCE[ettv]	7DBD626DE6F2F653FD72EA8A2D21EAF440410BE3	4/19/2017
73.109.59.21	Rogue One A Star Wars Story 2016 1080p BluRay 6CH 26GB	8A870F47B79F784CEC356C4F47A38093D57449D0	4/20/2017
73.109.59.21	The Chamber 2016 [1080p] [YTSAG]	BA7EBBC58FDB1A91D9642BA61A8F886C438BCB68	4/22/2017
73.109.59.21	Silence 2016 1080p YTS AG torrent	F659B04A8952D749722746AA711F5AB60CE3C044	4/22/2017
73.109.59.21	The Notebook 2004 1080p BrRip x264 YIFY	868E7F9C148FB8C70EB9E065AC29C265EAA73B6C	4/22/2017
73.109.59.21	Underworld Blood Wars 2016 [1080p] [YTSAG]	14070030C1C534EE31885CCB4886C8600018EEA	4/22/2017
73.109.59.21	Travis Tritt 1995 Greatest Hits From The Beginning [EAC FLAC] in Country Western	14CD8D15FBCF7655B246D5ED95C54690A1FEEAB5	4/23/2017
73.109.59.21	DoctorWho2005S10E00ChristmasSpecial720pHDTVx264FoV	35A88DC73EAA16B631B7BB4144E00DE01BE4FC81	4/23/2017
73.109.59.21	ScandalUS06E05HDTVx264SVA	94DD974CB5E1E37572CEAA18FB0FF65877E23932	4/25/2017
73.109.59.21	Nashville 2012 S04E20 HDTV x264 KILLERS ettv tv	4CAB336958FC78EDA4182421E03F6DA9BF867AB6	4/25/2017
73.109.59.21	Blaze and the Monster Machines S01E18 Cattle Drive 720p WEBRip x264 AAC tv	7B449180A4677153E0B88C56185FC50BA7C8E988	4/25/2017
73.109.59.21	BasketsS02E07HDTVx264SVA[eztv]mkv	C6CFEA720ECE7D5F8A14A50B4EDF97D52374FD2B	4/25/2017
73.109.59.21	Call of Duty Black Ops 3 PC game ^^nosTEAM^^ games pc game	8F6CD7A2D5E73DEB5B8F483D39E806DE9685C574	4/26/2017
73.109.59.21	Split 2016 [1080p] [YTS AG]	AA1FCD4067A829B6866D3D3D36263D993D994A69	4/26/2017
73.109.59.21	DJTWANEY DREMIX OF MEEK MILL IM ROLLINGwav	51E26768502E5068AC0CCCBBAFAF00C6EB302C6A	4/27/2017
73.109.59.21	Hus i helvete 2002 SWEDISH DVDrip XviD AC3andreaspetersson	51E0BAA9E01CBDD0199DC107C8A1F6EFFB5DB77E	4/27/2017
73.109.59.21	Prison Break 2x18 [RMVB]	51E1B945BA03AF322C6E356C44F003357828A9DA	4/27/2017
73.109.59.21	Underworld Blood Wars 2016 CAM Dual Audio Engl	E557782DB7DE956D234E4FA6F1A856304859D1	4/29/2017
73.109.59.21	Madagascar 2005 720p BrRip x264 500MB YIFY	812D818379FC820443FAD2D357654C114B3AAB5B	4/29/2017
73.109.59.21	Fantastic Beasts and Where to Find Them 2016 [1080p] [YTSAG]	945A012C70375ED7C08296E3215A506E221B2BEB	5/1/2017
73.109.59.21	Pop Will Eat Itself At Weirds Bar And Grill Live album	51F1E20FBAB89766B54E87B5D6800B2E9AEACAB9	5/2/2017
73.109.59.21	Jamie Foxx ? Baby?s In Love feat Kid Ink Single 2015 [iTunes Plus AAC M	7B850FEC473266D737E10C585EB1EB22B39E8879	5/2/2017
73.109.59.21	Kitaro [Ancient]	06CE1CE47B3D6D394150B8DE75CF1146501C64F6	5/2/2017
73.109.59.21	FrukoYSusTeso100SalsaDura	96972A3B54AFD4A8BDB2D0CE4EFE0148FE2B377D	5/2/2017
73.109.59.21	VA Terminal One compiled by V Falabella 2012 {PsyTrance Goa} [320Kbps]	708D859E1879D9329DD3F854CAF44A8B74162290	5/2/2017
73.109.59.21	FINAL RECORDINGmp3	06C4FD29D755C7955FF71F9CCF8F7D8721D93895	5/2/2017
73.109.59.21	Atrium Carceri Metropolis 2015 FLAC	721CF027433C043B172829AEDC5D3FBCB7808B46	5/2/2017
73.109.59.21	Nickelback Silver Side Up DTS 2	4160A4885B6865C68E103E93D04E2EF8817C0158	5/2/2017
73.109.59.21	Bartender DJ Inferno Mix mp3	06C6902569856A86CC74D8CED00B421DEC697482	5/2/2017
73.109.59.21	Omdaru radio music 2010 13new agefilm scoresneoclassical	2B6AC499C2B4DF9366E8C7A8F85CA4FFD50B7C990	5/2/2017
73.109.59.21	My Favourite Classics Beethoven Vol 1	21B74C69A8425DBEEAF4BCADB8903A5C83F88A38	5/2/2017
73.109.59.21	Manilla Road â€œ Playgroud of the Damned 2011	9B8C11EF3AB93DADC7BECD4865B824032DFAE621	5/2/2017
73.109.59.21	CKY Live in Hollywood 7309 FLAC	5CA06B90919E06FE6FC4AF80128756C58C483E75	5/2/2017
73.109.59.21	HanneBoel BlackWolf CBR320 mp3	721FB5D4D47D4536A2D01CC818670D081445EDB7	5/2/2017
73.109.59.21	George R R Martin Buz ve Atesin Sarkisi Pdf Indir	71074B84D3C1E37F04588499A3E77938C52F24DC	5/2/2017
73.109.59.21	Advanced Photoshop Issue 95 2012 PDF	8FB1DB3A0C57EE81BAA3CA6C10FD22EC6411C06E	5/2/2017
73.109.59.21	Anatomia aplicada a Odontologia	8D1FA4A95E46CB987E40D3A7E7FE0434AC06C7C4	5/2/2017
73.109.59.21	DONALD DUCK COMPLETE COMIC COLLECTIONPART 3 GREEK LANGUAGE	982ACA2AB1106B860D85C712038BF8D3FF11E14A	5/2/2017
73.109.59.21	CRC Handbook of Chemistry and Physics 85th Edition pdf	06CA099D6030ACF404653E120F3E911F8658612C	5/2/2017
73.109.59.21	Windows Powershell RU	55BF7079816CCBEFC371AF54DA192729A9D78E56	5/2/2017
73.109.59.21	A Dance of Dragons Series Books 12 By Kaitlyn Davis EPUBMOBIAZW3 ~KnightinKat	461BB1029EC121813B091195BF629780975F56B3	5/2/2017
73.109.59.21	Evil Ernie in Santa Fe Issues 1 thru 4	6F48779E1AF40C0DA956C02CDD095AF093A6A589	5/2/2017
73.109.59.21	USS Indianapolis Men of Courage 2016 1080p BrRip x	338AF51AC16ED7B8272308254838B2122BD6CAE8	5/2/2017



73.109.59.21	Moana 2016 1080p BluRay x264 DTSJK	3979A828A7FA105AF4A9E4AF6F33C5B3402A1D94	5/2/2017
73.109.59.21	Independence Day Resurgence 2016 720p BrRip x264 P2P	840904E61721EE9B8EE638E0EFF52273D647E727	5/2/2017
73.109.59.21	Wardealer pack 201609261753199747440722b303230300a9e1bfe83fbb844ceba9c9713ec63a6d8	0CC682FCC981B4327135D8C5900CE30F7A7A409D	5/2/2017
73.109.59.21	WoodmanCastingX White Angel 23 01 2017 rq 540p mp4	717B3E70DC0D69EE18B483BAF29EF2D4B82929DB	5/2/2017
73.109.59.21	MXSP5388 Ayase Narumi delicious Toko only 4 hours	8CC6F15B91386C9F05A0C5078D818AFB55D04484	5/2/2017
73.109.59.21	EarMaster Pro 500608S + Patch h33t CaZoR	0694CBF6FBAD752640D7FD3E2CFF22F4A3A2C705	5/2/2017
73.109.59.21	RIPIO HEAVY METAL	90ABE14B46D0B98ADBC3BEEF51906C70D28EAFE2	5/2/2017
73.109.59.21	6mp4	7150719AFABDC07435D49FBC930E51033D6BF9F9	5/2/2017
73.109.59.21	4K Video Downloader v37 Mac OS XOS X [ORGan	95C2C105F9DBF2E4CBF16B05DFD65A63FF2EFE1E	5/2/2017
73.109.59.21	5041701bigmp4	5068D3507A7BE63303EE08B657F9DF7F8889EF94	5/2/2017
73.109.59.21	22016SATRip AVCFilmsx	70E3F6FDE8D70C56E6E8C4046DA9C970139CC62D	5/2/2017
73.109.59.21	deadspincom sitemap20150105 20160827	8162253F335C9FA4CD984A82C88659CA39B18317	5/2/2017
73.109.59.21	lubuntu1610desktopi386iso	7907FEDF745991B8ABACC7F21E29155A38D9F6E29	5/2/2017
73.109.59.21	Limewire Turbo 5 4 1 rar	60B7DE48E054D167939B818E3551C2B9C0D6B2E3	5/2/2017
73.109.59.21	5mp4	0681D5A577D4D6D12A52C36E41097D113F05ECC2	5/2/2017
73.109.59.21	Tom Clancy s The Division Uplay Full UnlockedLordw007	523243FE20B79490E2F9149C765D6C3EBEE5BE38	5/2/2017
73.109.59.21	TheThirteenthFloor1999720pBluRay7xRusUkrEngmkv	71CE4709C72C235B7672EE38379E58A77469DE6C	5/2/2017
73.109.59.21	Startisback plus 1 7 5 crack zip	5A139BF8381D8B678C3E2D2DF63FB13E004D8942	5/2/2017
73.109.59.21	Xbox Flashing Tools {AmazingHacker}	4D1D0CBBED9BE5E531D3BC29A96A2441E709D3E0	5/2/2017
73.109.59.21	NASA Technical Reports Server NTRS 20090008412 Laser Metrology Heterodyne PhaseLocked Loop	71AFCB01E3B192095BE0602EC9A2DE7847AD45BF	5/2/2017
73.109.59.21	linuxlite3464bitiso	A683E4157C3F6F2ADAB5A15B23BB1F4425C91D84	5/2/2017
73.109.59.21	42KYUKK3 Somatic Cell Nuclear Transfer Animation   HHMI	71186DB4706F2DC666F7746CC57A6CBD3CDF3F5E	5/2/2017
73.109.59.21	Cardboard Boxer 2016 1080p BluRay x264 DTSJK	EADA790A0C7FE1548251BB598CAEA6C1F75237F4	5/2/2017
73.109.59.21	Recover My Files Pro v510 1824 Final Fully Activated	71DDA40092F059921D9E89A3BDB075FE18A913EC	5/2/2017
73.109.59.21	100 Most Amazing Collection of Computer Desktop Wallpapers 1509 [ECLiPSE] in Wallpapers by samcode4u	5A1A81A5917FFA5174816FE908B5BD8F56422680	5/2/2017
73.109.59.21	The Unspoken 2015 1080p WEBDL x264 AC3JK	333FE430FB8A589FAE1376DEA6489FA605DE180F	5/2/2017
73.109.59.21	Pumpimgnylonrm	0C723BB50C29FFFF0A26EAF09F9C3F0220F2A353	5/2/2017
73.109.59.21	TeamViewer Premium + Enterprise Activator }ANDROKiNGxD{	312D05E2FE99D8CEAE5D1488B69E5618E012C77A	5/2/2017
73.109.59.21	Kametsu NagiAsu A Lull in the Sea 16 BD 1080p Hi1	9D1BC910445F042AF5CC87DBD6CC08A0B7DA5B83	5/2/2017
73.109.59.21	Simon Stranger To Stranger Deluxe 2016 FLAC	9B13587BCE1F0ECEAFF31359F09ABD65F85C735D	5/2/2017
73.109.59.21	MC122	4EB99BD794B52680B8F60D148DD72DCED60C15F	5/2/2017
73.109.59.21	FSET671mp4	93C44ACC2E04E1DD780AD321C97F89AC9F9106C7	5/2/2017
73.109.59.21	Wife of Frankenstein 1960	7F4B7F763CB1FE3F38930B0C90CEE7515A601DD9	5/2/2017
73.109.59.21	BeautyMegranate2016KORHdRip720pH264AACSTYmp4	065A1B0F66D99AA08465EC5352AC2953EF201A7D	5/2/2017
73.109.59.21	Kid Ink My Own Lane DELUXE[2013] 320kbps MP3	6274B7D2FDA883B8BC42550DFD004284E0BE6C85	5/2/2017
73.109.59.21	govuscourtsilnb1309816	7DA0272B427ACDA47F4FC857A9FE447123B50ACA	5/2/2017
73.109.59.21	FootballManager2016CPY	2DB8C15FDAF3476C3315DD00442E98CE0EC0414C	5/2/2017
73.109.59.21	Nero 7 KeyGen	2F40F6A4A8E8FD18D7EFEA78CDD88FCD1A6BFDC11	5/2/2017
73.109.59.21	Windows 10 Pro VL X64 v1511 MULTI7 April 2016 {Gen2}	35024CA8FAF1CB1FE5F9AE9A7DBB8C8310468BBA	5/2/2017
73.109.59.21	Anachronox crack	453F3D0CAB4CF52CDB7F7C2D0C0CED6C6BA65BA1	5/2/2017
73.109.59.21	FL studio producer edition 111132 64 bit reg	7211C6EADAE47B6F0843768C165D3AD43FAD8BF93	5/2/2017
73.109.59.21	[HorribleSubs] Kotourasan 10 [720p]mkv	711CCCEBAC708473FC684DF17FE58EA58513B6CB	5/2/2017
73.109.59.21	Triple 9 2016 1080p BluRay x264 DTS JYK movies highres	9D8E91C2A7CA6B7E06FD7383EDDC5756CD6314DF	5/2/2017
73.109.59.21	Sisters2015UNRATEDHdRipXviDETRG	12BCC546ADF814F0F0C6539B9B0A562B1A493E7A	5/2/2017
73.109.59.21	The Birth of a Nation 2016 HDRip XviDETRG	A545A046B9FD03A44DDC4E09207EC78E129D3D734	5/2/2017
73.109.59.21	The Blackcoat039s Daughter 2015 HDRip XVID ETRG movies	C08523F92C7DAADD02F5D9B8C102E56C4EBFDA361	5/2/2017
73.109.59.21	WarriorsGate2016BDRipXviDAC3EVO	06E47B895532A9953ADCDF715F732B6FB2F44F70	5/2/2017
73.109.59.21	JohnWickChapter22017HDT5800MBx264Makintos13 in Action by Radioactive3m79736MB	587982E050EC94AE63BD6B46D14327B4056AECE1	5/2/2017
73.109.59.21	KongSkull Island2017HCHdRipXviDAC3ETRG	434CA07305C69F3B8F37F3E69957ECCC32D6BBAF	5/2/2017
73.109.59.21	Mechanic Resurrection 2016 1080p WEBRip x264 AACETRG	F279283301941A891F49A4AC2655725460D4547D	5/2/2017
73.109.59.21	xXx Return of Xander Cage 2017 NEW HDT5 HQCPG	0D9257E4657926E9297A6F16F1847E9CB2F1FA88	5/2/2017
73.109.59.21	Fantastic Beast and Where To Find Them 2016 HDT5 x264CPG in Adventure by Silmarillion	722A7442A3F75FDE9C6D01C11875A5A3398FD097	5/2/2017
73.109.59.21	Hacksaw Ridge 2016 1080p BRRip 1 9 GB iXtV	F0097F24810F4FCE5A2B98AF6051BE016B9D46CF	5/2/2017
73.109.59.21	TheGreatWall20161080pHCHdRipX264AC3EVO[EtHD]	E7D2DDF9AAAACD7A1D675AF00A44B59539AAED36	5/2/2017
73.109.59.21	Rapture2016HdRipXviDAC3EVO in SciFi by Silmarillio	DBE4D36B99E2554BAB51147138546A257FA5EB32	5/2/2017
73.109.59.21	Eliminators2016720pBRRipx264AACETRG in Action by O	8603910EF12C8781B2B2690EC9E9C71A162C4A1D	5/2/2017
73.109.59.21	TheFounder2016DVDSrXVIDAC3HQHiveCM8	8964F3E322F2AF66532C52A407828AB14D499F99	5/2/2017
73.109.59.21	Jack Reacher Never Go Back 20161080p WEBDL x264JYK	C59F08466937F1E6DF0EF49F57A0165A8EF7CCBB	5/2/2017
73.109.59.21	Operator2016HdRipXviDAC3EVO in Comedy by Silmarillion	4A5620D565D36AFB97FED18DC434767D3F709711	5/2/2017
73.109.59.21	A Good Day To Die Hard 2013 WEBDL XviDBiDA	91A502401551699C5B375C16F07BCACCB36B1F6	5/2/2017
73.109.59.21	Justice League Dark 2017 1080p BluRay x264 DTSJK	E01CCAC9183DC6F2C2E90F7156EC8F39FA90DFFA	5/2/2017
73.109.59.21	Cold Souls 2009 HDTVrip H264 Wrath	43BDC75CB9CA275DB3DC3AE0CA8D134F8CBBCD3	5/2/2017



73.109.59.21	The Strangers 2008 720p BrRip x264 YIFY	37650687313C517D38A04F5B090FABBEA141B911	5/2/2017
73.109.59.21	The Thinning 2016 HDRip XviDEVO	75CF2C1CFB5FF676E780042B1F24A98F6E449F44	5/2/2017
73.109.59.21	The Dilemma 2011 DVDR NL Sub NLTRelease Divx	26CF7252EA09CB5A2CCAFAC8AD66F329E0AEC9E4	5/2/2017
73.109.59.21	Alone in Berlin 2016 720p WEBRip x264 AACETR	FC154035D4CF6E09164A6AE0351A9E3051C028C7	5/2/2017
73.109.59.21	1TheWholeTruth2016HDRipXviDAC3EVO in Drama by Silmarillion	6277166BFD8D66F8B1C995F6D8F27FFA5FF9078	5/2/2017
73.109.59.21	The Light Between Oceans 2016 720p BrRip x264 YIFY	71ECE577E85F525510C438669CF21E1B9BDFE47	5/2/2017
73.109.59.21	Arrival 2016 DVDScr x264ARRIVED	FC74568406F54AC74FFA3BAC8F11FC6C7E6AB8EA	5/2/2017
73.109.59.21	Ali Baba e i 40 Ladroni 1971Hayao Miyazaki[XviD Ita Mp3]MIRCrewTNT Village	8457DCCB4812382500E170CD77E71E25209868E6	5/2/2017
73.109.59.21	BrÅfdrene Dal og mysteriet om Karl XlIs gamasjer DVD	06773A6762CE09D177FC76CA13D812D114071FA8	5/2/2017
73.109.59.21	How To Marry A Millionaire 1953 1080p YTS AG torrent	9D22454688415464EEDE99A6B6318CD524A981D3	5/2/2017
73.109.59.21	1DontBreathe2016BRRipXviDETRG in Horror by ETRG	E5BE1A15461E48C6D23A7746962388DD16424070	5/2/2017
73.109.59.21	Sleepless2017720pWEBDL750MBMkvCagemkv	4F7068FB388D325EB94BFACA58A4FFABD5814C43	5/2/2017
73.109.59.21	Kuttram 23 2017[HQCam x264 400MB Tamil] Lara	8D187CA8B3ACE9C32DC55F39EBEC481688AA2366	5/2/2017
73.109.59.21	Silence2016720pBRRipx264AACETR	2BADA1A489F7866BDE03CC5B3B2FB78E35CF5728	5/2/2017
73.109.59.21	StarWarsTheForceAwakens2015LowResOGGSTEREOH265CrAcKeZ	9AAB3D2CD491BC7B52DCF57BC62F84AB416B5290	5/2/2017
73.109.59.21	My Big Fat Greek Wedding 2 2016 HDRip XviD AC3 EVO movies	2001233E0AE76505FA3F3141269D538AB7FF839	5/2/2017
73.109.59.21	A Nightmare on Elm Street 2010 DVDR Counterfeit	9C64D1203CB88D8C56A94F274AC586B60DD93900	5/2/2017
73.109.59.21	TheInfiltrator2016720pBRRipx264AACETR in Biography by Ozlem	79FBE3251B40D18EB821BE6E6ABF36225F4985B4	5/2/2017
73.109.59.21	Cloverfield 2008 1080p BluRay AC3 x264nelly45	4FE90FE40C4E56A3C4962B8FA7AB0FEBCF0C71DA8	5/2/2017
73.109.59.21	Ninja Shadow of a Tear 2013 480p BDRip XviD AC3 51chGRG amp mucker	45FDCBF6116BF3A1BED686EF4F8A91FCOD00B5A0	5/2/2017
73.109.59.21	Lotus Eaters 2013 UNRATED HDRip XviDAQOS	71F300DFFB84560866884339941DA8B8439DA374	5/2/2017
73.109.59.21	Florence Foster Jenkins 2016 720p BrRip x264 DIME	3FEF5B285E7512296222D2D1CEE125ACDDF99513	5/2/2017
73.109.59.21	Live From ItalyMADONNACiao Italia[DVDRip XviD Eng Mp3 TNTVillage]	70C30DF1BD57803F8EF5C6000D9F890FEC7A8564	5/2/2017
73.109.59.21	2012 2009 BRRip 720p[Dual Audio] [HindiEnglish]~MrJERKY	7A7562E21C3AB5EB51032B1FF3F361276CD7A43E	5/2/2017
73.109.59.21	The Sorcerers Aprentice 2010PAL DVD9 ISO [multisubs] NLRele	8EB2C1124E71EB07FBBE33640DD06F112A261B6	5/2/2017
73.109.59.21	Alvin and the Chipmunks The Road Chip 2015 CAMRip Clear Sound	54AA44D3B57FABC77BA032CEC942238EC580AB2D	5/2/2017
73.109.59.21	Ong Bak 2003 BRrip 720p [Triple Audio] [EngHindiThai]~MSBHATTI [First On Net]	63C7AD27094990E979229A6651332AC48ED18B49	5/2/2017
73.109.59.21	The Lying Game S02E06 HDTV x264ASAP[ettv]	71F73CFBE9BEFBD48005917E2B087DBF84CC663	5/2/2017
73.109.59.21	TheAmericans2013S05E03WEBDLXviDFUM[ettv]	FD1CC807860D740B3A12729E88D3D02A1A20A5ED	5/2/2017
73.109.59.21	LakeLifeS02E03720pHEVCx265MeGusta	33A75C4BA1D8B3B04569EE4D8836AEC8347052A	5/2/2017
73.109.59.21	Transformers Robots in Disguise 2015 S01E25 Battlegrounds Part 1 720p WEB DL x264 AAC tv	7224326C8AF539668ABE62C1F0A4F078E47FF2F1	5/2/2017
73.109.59.21	TheAmericans2013S05E05WEBDLXviDFUM[ettv]	A57A41BACC82BF333346F507C5EE3CB804E83C7C	5/2/2017
73.109.59.21	TheAmericans2013S05E01HDTVx264KILLERS[ettv] in Other by ettv3m27414MB	C85FA62BCC3983D625CF8EC22371A92C47ADC495	5/2/2017
73.109.59.21	Smallville S08E15 SPANISH ESPA?OL HDTV XviDNEWPCT [Isohuntto] from Series tv	71495C8C2D671400DF911151A6864B9EE86A6244	5/2/2017
73.109.59.21	NCISNewOrleansS03E20HDTVx264SVA[eztv]mkv	87367EC967E0B4B2A48DC1EBBD1EF9D176A5BF98	5/2/2017
73.109.59.21	BurnNoticeS05E01HDTVXviDSultantElwardLOL[VTV]avi	26F14A67E43E1EA7CEDECEFC2C72EF40DBF46060A	5/2/2017
73.109.59.21	FamilyGuyS15E08HDTVx264FLEETrarbg	6CCD055B141114434EACCEDAE0E0F756D1152E55	5/2/2017
73.109.59.21	TheAmericans2013S05E04WEBDLXviDFUM[ettv]	FA0C59E6690A8676DB5711F786EBE5929C86853	5/2/2017
73.109.59.21	JeopardyS2014E197S31 Tournament of Champions Quarterfinal Game 4mp4	4DB6CE41756DC69F3F4FC8570A65247415D3FEE9	5/2/2017
73.109.59.21	TheAmericans2013S05E02WEBDLXviDFUM[ettv]	AEC7B5E3E50F5328BE0299420572B4492FAF4C9B	5/2/2017
73.109.59.21	Blue Bloods S03E20 1080p WEBDL DD5 1 H 264KINGS	717D90BA31F68E8B5D63C7D06FA1CE19E34BEB0D	5/2/2017
73.109.59.21	TheVampireDiariesS01E17DVDRipBGAUDIOXviD HBPrinceavi	60889F9EB30954C06B99F1D580FEDF5DD63E7F10	5/2/2017
73.109.59.21	TorchwoodS02E02SleeperHDTVXviDFoV	424EC882838A6007FE85BB1A43C5E9462D691F9A	5/2/2017
73.109.59.21	GrimmS06E08HDTVx264SVA[eztv]mkv	06C3AFFE72F9DA18240B11826D10A2A4477CA57	5/2/2017
73.109.59.21	QuanticoS02E10HDTVx264LOLrarbg	067B22F6BDF90398C4664FF3C81797D3935CDEC8	5/2/2017
73.109.59.21	SixDegreesS01E08HDTVXviDNoTv	03906F39541D0F8D8C17B8BC961AC718B1118736	5/2/2017
73.109.59.21	ArrowS02E23720pHDTVx264DIMENSION [PublicHD]	9AD432FC23DDCE3845716C8FB5F7A850DE728AB	5/2/2017
73.109.59.21	[katcr]dibskaraokeforwelovekaraoke	8AAEBC18F83A9BC6E6C8B1A902B2BA3E16F85EA8	5/5/2017
73.109.59.21	[REDACTED]	[REDACTED]	5/5/2017
73.109.59.21	Windows 10 Pro VL X64 Office16 ptBR March 2016 {Generation2}	8AAE97E7D319754EDE955998AEDC2BB346F7E111	5/5/2017
73.109.59.21	Taken 3 2014 720p BrRip x264 YIFY movies hd highres	8AB05F86CA0390FA77C6E1DD03F96926CDC2D904	5/5/2017
73.109.59.21	Tagalog Always Be My Maybe 2016 buhaypirata 720p BPN avi movies asian	8AB08E796D636A297177070576F29228D3C8DD14	5/5/2017
73.109.59.21	GetOut2017HDCAM700MBx264DiRG in Comedy by Mulva198914m71475MB	C7979CE655FD38300B5764835444518DE9812FE9	5/5/2017
73.109.59.21	APOL 034	8AABE9228327094DCECADFDBF7BDC2F950467A74	5/5/2017
73.109.59.21	Supernatural S12E20 HDTV x264SVA	D73AABC4F8A0ECB3344B25383465A163F850B424	5/5/2017
73.109.59.21	Criminal Minds S12E21 HDTV x264SVA[eztv]	438AE17954BE37B9FD077B73ABD84504B85AF1A3	5/5/2017
73.109.59.21	Arrow S05E20 HDTV x264SVA [eztv]	6A482BCA610625F3F551249192BF8651631B61EE	5/5/2017

73.109.59.21	Blindspot S02E20 HDTV x264SVA [eztv]	CE9F2F5472C4610F2A01E4FECACBFDE24CA7810	5/5/2017
73.109.59.21	New Girl S05E07 720p WEB DL HEVC x265 RMTeam 720p HEVC tv	8AB0214DD49A7504DABA5CD009EB75337B9C29A2	5/5/2017
73.109.59.21	The Blacklist S04E19 HDTV x264KILLERS [eztv]	8AB401940DC79CD3DE6B8F08692A353C3E3D389D	5/5/2017
73.109.59.21	Marvels Agents of S H I E L D S04E20 REPACK HDTV x264KILLERS[ezt	7D371CB7E6FFBB2DDEA7BFBD064E02363AC0EC18	5/5/2017
73.109.59.21	Adobe After Effects CC 2015 v135 Crack in Windows Other	833D62ACDD363BCEA3F2FAFEB56ADBFD5A56B7959	5/12/2017
73.109.59.21	Adobe Photoshop CC 2015 20150529 r 88 32 64Bit Crack applications windows	89EBCCD43FA8F75F8439896AE5211EA60E041A4F	5/12/2017
73.109.59.21	Adobe InDesign CC 2015 v110 x86x64 RUSENG {by M0nkrus}TEAM OS in Windows Photo Editing	EEF48E92D8BD3A30976AAD7F173F0B9E31FEC4C8	5/12/2017
73.109.59.21	Voice from the Stone 2017 720p WEB DL 700MB MkvCage mkv torrent	96AAF995A52278BA93F9A0DEE17FC8CC9D49B2D4	5/12/2017
73.109.59.21	Furious Seven 2015 720p BrRip x264 YIFY movies highres	62AA7295177FB56FE95311E45C588821DF670F64	5/13/2017
73.109.59.21	TheHatefulEight2015DVDScrXVIDAC3HQHiveCM8	08515290D557A2A313DB61C2ED2765E9CB845839	5/18/2017
73.109.59.21	Storks 2016 YTSAG	55F3488A86261E576A8A34CD90CE6516BFD5379F	5/21/2017
73.109.59.21	The Chainsmokers Dont Let Me Down feat Daya 2016	B122A9813EAD66037C8422441A4E87311C8FE5E7	5/27/2017
73.109.59.21	Marvel Cinematic Universe Phase One + Extras 2008 2012 1080p BluRay x264 Dual Audio [English 71 + 51] + [Hindi 51 + 20] TBI	EF3A9D9AFDF779DBB4AF2143B5D6A9ADA39A5F3E	5/27/2017
73.109.59.21	Assassinâ€™s Creed 2016 720p WEBDL 950MB MkvCage	752658C41E91914D92B105152AC54151D6CA2A52	5/29/2017
73.109.59.21	Scream 4 2011 720p BrRip x264 650MB YIFY	52F92D8B7BF5141CEF2843DBBF69B34A0C0FF65D	5/30/2017
73.109.59.21	New Girl S05E11 720p HDTV x264 AVS rartv tv	0EFE01EFDA2C42B500BF257020746CEBF028174D	5/31/2017
73.109.59.21	Quantico S01E21 HDTV x264LOL[ettv]	0ED8DDE1DC55D7D2CDCE652274A7A6C8D608B6FD	5/31/2017
73.109.59.21	01 Sucker For Pain with Logic Ty Dolla ign amp X Ambassadors mp3 music	2CF3BE9053C67401594CF32740D380981E8A4F18	6/1/2017
73.109.59.21	EXTORRENTYORGPL SztukaKochania2017PL720pBRRipAC351	40E8728E14AD85566230C009160CA447F38D47E4	6/8/2017
73.109.59.21	Po Prostu Przyja��, [2016] FILM POLSKI 720p DVDRIp AACx264 [ENTER1973]mp4	6745600E543C7BF02FFEE03FA1154EE64050E06E	6/8/2017
73.109.59.21	Keeping Up With the Kardashians S12E11 Got MILF HDTV x264 CRiMSON PRIME tv	0EEC3E497505BA5133E0ACD033266A3C7521E4B8	6/17/2017
73.109.59.21	Keeping Up With the Kardashians S12E15 Blood Sweat and Fears HDTV x264CRiMSON[PRIME]	483C794399327C360F815E169C18EB2F9E30EF33	6/17/2017
73.109.59.21	Love and Hip Hop Atlanta S05E10 HDTV x264 CRiMSON rartv tv	560E12CE4ECD31E127E2977650DCE3B609FFFE1D	6/17/2017
73.109.59.21	OnceUponaTimeinVenice2017720pWEBDLx264M2Tv	9CD3B5E17B19740BCD9A2DEA0EFAD3C5ED0DBE43	6/22/2017
73.109.59.21	Kong Skull Island 2017 HC 720p HDRip 1GB ShAaNiG	BC6260EA06363B6D0B9FD637AFDAEC1FFAF65C6A	6/22/2017
73.109.59.21	Miss Peregrine39s Home For Peculiar Children 2016	AC1D164A300291B6A5F89902089ED400336ABC45	6/23/2017
73.109.59.21	Creed 2015 [YTS AG]	D0466421B957AAC48251944EF2B6561FF918F859	6/23/2017
73.109.59.21	The Hangover 2009UNRATED 720p BrRip x264 600MB YIFY	47EE25CF294184B05868C67134FA5C6AB41E34BD	6/23/2017
73.109.59.21	The Magnificent Seven 2016 720p YTS AG	2654480F1BD187024016281A344E5AB1D5548CF	6/23/2017
73.109.59.21	Stoner Express	CCA2D82C1F892B6A2B3DAA2406F17F1DBD5032FD	6/23/2017
73.109.59.21	Heroes Of Might And Magic V Tribes Of The East	8299B5B3E8A742EA98A6E4AFA73DFCF5692F7D43	6/24/2017
73.109.59.21	Unlocked 2017 [Russian Cam XviD AC3 700MB] Lara	1DEFEE1FD2DB3C5C08429C7A619E58401E9B5F97F	6/25/2017
73.109.59.21	10 Days in a Madhouse 2015 BRRip XviD MP3 RARBG torrent	6F119FFC49D4B2D3F1F359FC06BAB318AFEB756B	6/27/2017
73.109.59.21	The Bad Batch 2016 720p WEBDL 900MB MkvCage	275B8399070FA0CEEE9DA1B9DAA62399E62E04A	6/27/2017
73.109.59.21	Harold and Kumar Escape From Guantanamo Bay Unrated DVDRIp XviD[CANUS XVID]Jizza	1233B4033BFC533501A20D7B362118FC6C45E2F9	6/27/2017
73.109.59.21	Big Sean Dark Sky Paradise [Deluxe][2015][320]	05637C19005CA8288BAC8EC69A3FB37592DC81EA	7/1/2017
73.109.59.21	Warriors Gate 2016 YTS AG torrent	EBFEEC89432E4C091B404063E19B738069DB5C98	7/6/2017
73.109.59.21	Ballers 2015 S02E01 HDTV x264 KILLERS ettv tv	BC4CBA9EB337CD2BAAC33F1AC3F2AA1AA7FE529	7/6/2017
73.109.59.21	Ballers2015S02E07HDTVx264KILLERS[ettv] in Other	056B2668E9DEC7DF52A86111854FAEBA07D1792B6	7/6/2017
73.109.59.21	Ballers2015S02E06HDTVx264KILLERS[ettv] in Other	8013E90ACDDF392329BC400C1DFD44030CA0A147	7/6/2017
73.109.59.21	Ballers2015S02E05HDTVx264KILLERS[ettv] in Other	2C54CBEB8C8042F109A3124DE6478265F11F0EDC	7/6/2017
73.109.59.21	Ballers2015S02E04HDTVx264KILLERS[ettv] in Other	29BCF14DE1DA0649488EFE2B6C5012F05A3936F8	7/6/2017
73.109.59.21	Ballers2015S02E03HDTVx264KILLERS[ettv] in Other	5C0621BF727127A6D87A38F3EB5123E6CBA6D294	7/6/2017
73.109.59.21	Ballers2015S02E02HDTVx264KILLERS[ettv] in Other	223D756848D2336997236EA2F7C59873D1FDD732	7/6/2017
73.109.59.21	Lynyrd Skynyrd Pronounced L��hn��rd Skinn��rd amp Second Helping Live From Jacksonville at The Florida Theatre 2015 1080p BluRay AC3 x264 mkv	F4CC718134DDBC4B667637CA01127F9B7872705D	7/11/2017
73.109.59.21	Countdown2016720pBluRayx264FOX	30063B911840C38E3413DD280921EB6F6A036315	7/11/2017
73.109.59.21	Transformers Age of Extinction 2014 720p BrRip x264 YIFY	543751FDD79BF7A452D675816D4CDDF75CAD1D8E	7/12/2017
73.109.59.21	Taylor Swift Shake It Off [2014Single]	620FBFF9B646B24406AA9ACCD1C273C670EE06F8	7/17/2017
73.109.59.21	ACDC The Best Songs 2016 [MP3~320Kbps]~[Hunter] [FRG] in Rock	C6F8AD3D30084E1617DF79B8FDBF1FB12E452F1F	7/17/2017
73.109.59.21	Logan 2017 HDTS UNCENSORED x264 AC3CPG	C4C849829F4C9BEFB04503D4CE61352F817382E7	7/17/2017
73.109.59.21	The Wire Season 1 DVDRIp x264	22E2897CFB2C74F84D75D6E351B7076C978335A9	7/18/2017
73.109.59.21	TheConjuring22016HDTSXvidMp3MAXPRO in Horror	C7348BD61A4B12CC02FE6C237A5984FC3285ADD7	7/19/2017
73.109.59.21	Split20161080pBRRipx264AACETR	5960AC7068FB8333BE8C12F3E28F43D28E98F7C1	7/19/2017
73.109.59.21	Frozen 2013 720p BrRip x264 YIFY	25B4CD46E389E96F80EE42E418CD89D3A65ECD66	7/21/2017

73.109.59.21	Fear the Walking Dead S03E08 Children of Wrath 720p AMZN WEBRip DDP5 1 x264VLAD[rarbg]	35A85A70289F56BB3B88575336C8235ADCECE31F	7/25/2017
73.109.59.21	Preacher S01E09 HDTV x264FLEET [eztv]	6464D38A1580C95FB88A159B45DF93CCCC0EC148	7/26/2017
73.109.59.21	Preacher S01E08 720p HDTV x264AVS [eztv]	FBECF4FEABE5762792D02771508964EA7F68783B	7/26/2017
73.109.59.21	Preacher S01E06 HDTV x264FLEET mkv	C5E279FC9D7D71D57B1E0631B32C1E8F41862220	7/26/2017
73.109.59.21	The Circle 2017 HDRip 700MB MkVcage	3679E985CCD5B036B4605D020CFA9AE37513475E	7/27/2017
73.109.59.21	VA Threat Of Life Breaking Audio [BRE145] WEB 2017	F88024E2A745CECB9177EF5C4BFF31068D09895E	7/29/2017
73.109.59.21	Schwartz v National Home Trust Corporation	CDE4A1C377EF5BCBBE555584794CAE81CD3F76D3	7/29/2017
73.109.59.21	Endless Love 2014 DVDrip XviD MAXSPEED	7C3560487D48A3297B38B53D196C4ECAED909278	7/29/2017
73.109.59.21	WizardLove226102WWENoviiCF2 TZN Release	85521BD1153970766B139037D40582F20E3D5014	7/29/2017
73.109.59.21	[LeopardRaws] Sagrada Reset 01 RAW MX 1280x720 x264 AACmp4	DC315BEC3F354531A2652F7CC63B390A1CB705A0	7/29/2017
73.109.59.21	HyruleWarriorsLegendsUSA3DSSUXXORS	0C58E4306F99051FC118DDE4D1CC31C7DCC963C6	7/29/2017
73.109.59.21	Native Instruments Guitar Rig 5 v522 UPDATE UNLOCKED OS X [d	17D3C5F057B5A237C5458A5DFA6436C6CC0F273C	7/29/2017
73.109.59.21	Impact 1949 Brian Donlevy Eng	F8E648BD956B2B1E6D4BBEF5C3ACE4EB4A2B836	7/29/2017
73.109.59.21	WhyHim20161080pBluRayH264AACRARBG	98950D93F99A8DC9E89032EFAAAEA01F5E25FBB5	7/29/2017
73.109.59.21	ISIS Clearing the Eye	7EF759AA0008BA50D65B15E5095187D86D377BAE	7/29/2017
73.109.59.21	Parzania 2007 1cd Dvdrip Xvid Mp4 xRG Release [www desidhamal com]	14305462D5150DB3DEF4F44D5F0BC1CAA896B621	7/29/2017
73.109.59.21	Rough Guide to Short Breaks s01e10 10 April 2008 [TVrip XviD]	0F6A5A9D5FE0DB4C223901D1055305A55F045383	7/29/2017
73.109.59.21	Space above and beyond Dvd4 e9e10 [NL] [ENG] Sub	F95F51D9225D96101A78EE6586C686FD50257F0F	7/29/2017
73.109.59.21	Damages S05E07 AHDTV x264MOMENTUM [eztv]	EEFBB0849EEF513C38E3C63A2686EE88AF98C8BD	7/29/2017
73.109.59.21	Wakefield 2017 DVDrip 700MB MkVcage	92FC3866538DCB57E6B591EC987A04FDEE165633	7/31/2017
73.109.59.21	Kidnap 2017 720p WEBDL 750MB MkVcage	856F42F63C31A15FBF5C62DCD7FF516BB910DDD2	8/3/2017
73.109.59.21	VMware Workstation Pro 1200 Build 2985596 64bit [ENG] [Serial] [ATTEAM]rar	CD7CA0787B3CA60B3A8FC733ABB53844F20BDAAE	8/6/2017
73.109.59.21	Kidnap2017WEBDLx264FGT [HDSector]	58B07D290B90AA18CC321DA09EC3623FC07E64F5	8/12/2017
73.109.59.21	Kodak Black Painting Pictures [2017Album]	F703AB2A7C2CFE5D7908BF5C2ED21B090B2870F2	8/16/2017
73.109.59.21	Dimitri Vegas amp Like Mike Smash The House Radio 93 20150206SPLITCLUBTIM	0AAB25F02EAA392ED1A788D75616A639157AC9D5	8/16/2017
73.109.59.21	JusticeLeagueDark2017HDRipXviDAC3EVO	DFDA3D53FED4AD750AF50FF93F22F5ED23762C60	8/16/2017
73.109.59.21	Teen Titans The Judas Contract	812749B649C7CF006D4E5EEE2F333693B1D7CBE2	8/16/2017
73.109.59.21	1A Cure for Wellness 2017 HDTs x264 AC3CPG in Mystery by Silmarillion1h236GB	0CA4134DAF0E382A63CF23A8A7A4F6DCA32DDF53	8/16/2017
73.109.59.21	FistFight2017720pBluRayx264DRONES[PRiME] in Comedy by Simmoncelli1h443GB	F2892787B89EBB4C31D2F9AC6B9AA37C61E41F4E	8/16/2017
73.109.59.21	Spider Man Homecoming 2017 Worldfree4u trade 720p HQ Real DVDScr x264 Dual Audio Tamil English mkv torrent	7787A4098687AEED681ADE6FB756FC47B86FA1BA	8/17/2017
73.109.59.21	Advanced SystemCare Pro 10 2 0 721 Multilingual Keys	B1FA9E33F7F2A72E955A6A3C025121C32267B07E	8/18/2017
73.109.59.21	Play the Game 2009 720p BrRip x264 YIFY movies highres	1BA824419BEC1C1DD1300302EDEAA4275919DB4F	8/18/2017
73.109.59.21	Storks 2016 1080p BluRay x264 AC3JYK	1EBB7A6AD282F5D3064EBA944E08F58F6958E28B	8/21/2017
73.109.59.21	Adobe Premiere Pro CC 2015 v9 0 Crack applications windows	B6D07AF1BA3877AB504EC99B7CC69BB319C18CE4	8/24/2017
73.109.59.21	The ATeam Season 15 Complete x265 NihK	8A04DB3D85DC4ADE8214F9D46869A9C2EB693921	8/25/2017
73.109.59.21	Daft Punk Around The Worldmp3	D1464C843481729F7C793C3A6DF7DACC0F5029B1	8/26/2017
73.109.59.21	The grits My life be like ooh ahh Tokyo drift soundtrack	2B1BA820DA8618F9602B1371F9E2783E58789E8	8/26/2017
73.109.59.21	IntelliJIDEALicenseServerv13zip	2289E4F8CEB346AC44E54C8C0DA706CC537301AA	8/28/2017
73.109.59.21	First Kill 2017 [720p] [YTS] [YIFY]	1937E70439A5C626981A9DD5EA849F6F4CB0F815	8/30/2017
73.109.59.21	Game of Thrones S07E06 [Leaked] [ECLiPSE] [eztv]	FFFE8DDDE07E18DE05DAB8EA4884C5D7E6A97818	8/30/2017
73.109.59.21	Americas Got Talent S12E16 WEB x264TBS [eztv]	54339877492BC626CE46520662B7F36B7C488123	8/30/2017
73.109.59.21	MarvelUltimateAlliance2Update1rar	D2B74D51563BABA256284DBF74D356E6D35922C3	8/31/2017
73.109.59.21	WonderWoman2017720p1080Px264750MB	3CD752F7BDC4A59323616B2495AC3B64907853B4	8/31/2017
73.109.59.21	The Hitmans Bodyguard 2017 720p WEBRip 850 MB iExTV	E6F3FE79CE21BD762DF6A236060A5A8739189DE6	8/31/2017
73.109.59.21	Unlocked 2017 720p BRrip 700 mb iExTV	BCA01B3462DDC00B88525FE831DBCCE82FE7ADA3D	8/31/2017
73.109.59.21	01 My Way feat Monty mp3 music mp3	58DACDF5EB729F4FAB3CC2266C363F955C15F954	9/3/2017
73.109.59.21	Fetty Wap Trap Queen	79566E4F2B9C7ADC55790F9A116872A94886005F	9/3/2017
73.109.59.21	Inconceivable20171080pWEBDLDD51H264FGT [HDSector]	AACC53117EF8C70AD34866AE95841249AAF4B304	9/3/2017
73.109.59.21	Fantastic Beasts and Where to Find Them 2016 720p	7A5D06CFB8FC7D0E88013FA8814C83D469023929	9/4/2017
73.109.59.21	MacOSXSierrav10123	F1715EF78886D54C2EAF7CD6E44A2CA462E981AE	9/8/2017
73.109.59.21	Taken 2 2012 720p BrRip x264 YIFY	957733FA97AE8ACC5E98127DB5FCC0C9DC54853	9/9/2017
73.109.59.21	Taken 2008 1080p BrRip x264 13GB YIFY	3526E87D5D6B24F4F8A0B1A9575F7FACEE81DC3B	9/9/2017
73.109.59.21	Crash 2004 720p BrRip x264 YIFY	F00C2F664818127192E59BD5A78554484DDED161	9/11/2017
73.109.59.21	Power 2014 S04E08 Its Done AHDTV x264CRiMSON[ettv]	38CB6A5E7FCD8A78AABF7E6D66CA7DEE83573F8B	9/11/2017
73.109.59.21	Power 2014 S04E04 HDTV x264Dark	9EFFE83B0D6FA13217D0B00B14E24B29DCAD289	9/11/2017
73.109.59.21	Power2014S04E07YouLiedToMyFaceAHDTVx264CRiMSON[ettv]	7D0AD448EDD337AE16422243B7F9046007EEC3A6	9/11/2017
73.109.59.21	Power2014S04E06WEBRipx264PBS[ettv]	411FA234E70DB99C0259ED2519BD575E54F023E0	9/11/2017
73.109.59.21	DJ Paul amp Lord Infamous Come With Me 2 Hell music mp3	07AC5ACFD113655AED62CF0D8088933EA077CABF	9/12/2017
73.109.59.21	Max Steel 2016 1080p BluRay x264 DTSJYK in Action	FB98074196A59648CD2E8AAFBD4F36E8ABC48CB	9/13/2017
73.109.59.21	The Hitmans Bodyguard 2017 1080p WEBDL DD5 1 x264PSYPHER	3B6B89F50504E5CA54D279FB95F023040C9A7860	9/13/2017
73.109.59.21	First Kill 2017 1080p 10bit BluRay 6CH x265 HEVCPSA	806757E58C0439C8160BF5AA560969E56B966B14	9/13/2017

73.109.59.21	The Belko Experiment 2016 1080p BluRay x264 AAC 51 Esub MR	8A9726DAF6B8CD9ABA82B23C3419A6B890644313	9/13/2017
73.109.59.21	FeartheWalkingDeadS03E03HDTVx264SVA[ettv]	AB1F20D3E02756A0EC31F93624BE6D38F01EA7B0	9/13/2017
73.109.59.21	FeartheWalkingDeadS03E02HDTVx264SVA	1D52D76BD0AF8529CBBBAFA9A53EC7BDF1D5D7E87	9/13/2017
73.109.59.21	The Sims 4 RELOADED games pc game	3B24AABBF141C0539BB449C0CE1C1A0FB5072A6	9/14/2017
73.109.59.21	GunShy20171080pWEBDLDD51H264FGT	EC82E7142F8597E9B3EE8A6B703082663F565A89	9/14/2017
73.109.59.21	Whitney Can I Be Me 2017 [720p] [YTS] [YIFY]	D22326B4F8576951C758BDE9A56B9FC456E052E	9/14/2017
73.109.59.21	Green Room 2015 1080p BrRip x264 YIFY	2D7EE242491B4C3B5B77EC2CA61BE59B21142E2D	9/16/2017
73.109.59.21	300 Rise of an Empire 2014 1080p BrRip x264 YIFY	344E74A9B07EC8D3F00627A38F45483A3DB08A04	9/16/2017
73.109.59.21	Flubber 1997 720p HDTV x264 650MB YIFY	22E355BC68D2E2775C7D7A39D14225FFE5E927D6	9/16/2017
73.109.59.21	Pirates of the Caribbean Dead Men Tell No Tales 2017 WEBDL x264FGT[rarbg]	ED851D0CF35E853B52D48F45F722931DA13F1535	9/16/2017
73.109.59.21	Wonder Woman 2017 1080p BluRay x264 YTS	995F4ACCFB50711D0F8B1DE8B098CAD1EA9ADE47	9/16/2017
73.109.59.21	John Wick Chapter 2 2017 1080p WEBDL DD51 H264 FGT	77993A9F1DE5B06A33807F4C80832AD93B58016E	9/16/2017
73.109.59.21	Moana 2016 1080p YTSAG	635F4FE104291989E433EF7100C33F6106E85007	9/18/2017
73.109.59.21	Baywatch 2017 1080p WEBDL 6CH 17GB MkvCage	CAEEF9FA8ED2F8530A6A3D3090AEC42D4A93395F1	9/18/2017
73.109.59.21	AmericanHorrorStoryS07E01HDTVx264SVA[ettv]	7C9F2F942413A8CC6DCB0ACAEEFD7DD748F8E14217	9/21/2017
73.109.59.21	Power2014S04E09ThatAintMeAHDTVx264CRiMSON[ettv]	F9F8AFF9450D3D5F7631E5BD510509609F6831F1	9/21/2017
73.109.59.21	BillionsS02E05PROPERHDTVx264KILLERS[ettv]	66AB9EECC25C3A525D1756E7877504C0EBB3DD994	9/24/2017
73.109.59.21	BillionsS02E07HDTVx264SVA[eztv]mkv	C093FCE1208B9FCADCECD8098B432B067EADABE2	9/24/2017
73.109.59.21	Unbroken 2014 720p BrRip x264 YIFY in Movies Other	59BC11FC8E41CF8FD6286D02D9B04B59A6E29346	9/26/2017
73.109.59.21	AIMP 413 Build 1887 Final Repack by AMI Extendedex	54D02AF6919BD22CBAD13B92727538300E7C193	9/27/2017
73.109.59.21	Colossal2016HCHDRipXviDAC3FK in Action by Silmarillion13m137GB	A353C79151369DEBFED7A04A4F983F2BC4576D94	9/27/2017
73.109.59.21	GuardiansoftheGalaxyVol22017HDRipXviDAC3EVO	97E1847B5FED348C925F0D09B960A9F5BAD66608	9/27/2017
73.109.59.21	AmericanVandalS01E07WEBx264STRIFE[ettv]	AB1EEAF90BA4B5637A8F8DCF5CB0B4283A08B274	9/27/2017
73.109.59.21	Rage Against The Machine Evil Empire 1996 [SACD] 2016 AF Remaster ISO	91C960626CB74CAEFF712689F89ADF1DB9B29363	9/28/2017
73.109.59.21	Rascal Flatts Nothing Like This MP3	3A4C92F418C22331376D2DEE7485007B7103F093	10/4/2017
73.109.59.21	War for the Planet of the Apes 2017 720p HC HDRip X264 AC3EVO	C50A90C262AB947C68ADF81538630CC6D15DC6FF	10/4/2017
73.109.59.21	TheWall2017720pWEBDLXviDAC3FGT	B21D72C280226FFF2E0F4DC7C4F51D22EF816F4B	10/4/2017
73.109.59.21	SpiderMan Homecoming 2017 720p HDTC x264 AAC Down	E3AB7B0187B68758B2248FC1C7FAF718F36B5EOC	10/4/2017
73.109.59.21	Windows 10 Final AIO 22 in 1 32 Bit and 64 Bit ISO activator applications windows	027E06337CEA42BA833FE3A890E46D8DCBA16B04	10/7/2017
73.109.59.21	TheHungerGamesMockingjayPart22015720pBRRipx264AACETRg in Adventure	BDC04670BEC324B5173809898CB3C30EE3E94F4E	10/11/2017
73.109.59.21	SonicManiaCPY	A35488731522E707E857CC33F3F26AC5707DB73B	10/15/2017
73.109.59.21	Transformers The Last Knight 2017 1080p WEBDL 6CH 27GB MkvCage	33E3D45F8EC01DD81294E3E13E6C4664DAA6CC88	10/15/2017
73.109.59.21	Anti Matter 2016 1080p WEBDL AAC2 0 H264FGT	68B8F2BF267A8D2D5F8CDA26BBCD6763F1FD8DD0	10/15/2017
73.109.59.21	Kingsman The Golden Circle 2017 720p HDTS x264 HQ CPG	17FF689B0D40471D4C4703BB0B543EA22544658F	10/15/2017
73.109.59.21	Ã«ÃÃ¼Ã«ã€œã€Ã–ËœÃªÃ–Ã Ã–Ã–ã‚– E521 170405 720p NEXT torrent	A354AE58DA545952646870D163D1BD322043C497	10/15/2017
73.109.59.21	HacksawRidge20164KUltraHDBluRay2160px264AAC51POOP	7CAFDF57198217425BF1F43A09480ADE066A12350	10/15/2017
73.109.59.21	Maroon 5 Payphone [Lyric Video] ft Wiz Khalifa [1080p] [BL]	A35B1266535A340875F07BB48BC3781ACD3350A8	10/15/2017
73.109.59.21	TheMummy20171080pWEBDLDD51H264FGT	53B75F1CA47837BE40B706772E6D4940BF547038	10/15/2017
73.109.59.21	The Boss Baby 2017 1080p WEBDL 6CH ShAaNig	7D90753CE8C2B915EFA0C86B96CFA6238CF1916E	10/15/2017
73.109.59.21	Dunkirk 2017 Movies HD TS XviD Clean Audio AAC New Source with Sample ?rDX?	2BD174B0615D537B59E00FB64C11ADDC565C1E29	10/18/2017
73.109.59.21	Mother 2017 HDCAM X264 HQMicP2P	A79668E9D651F53F3E5084D34A6F457FBC52AAFE	10/18/2017
73.109.59.21	SupernaturalS1 tv	F42439CE48858AE3F35A7E890603D25EB5896B06	10/20/2017
73.109.59.21	IT2017720pNEVHDTSS60fpsx264	412B41E917AAB58B4C2157A6EF74DAFOC959D1394	10/21/2017
73.109.59.21	VanHelsing2004BDRipavi	FFF291F1999681006730BF7FA819439F88BDAC13	10/28/2017
73.109.59.21	ðŸŸ©ðŸ»ðŸŸ©ð		



73.109.59.21	Arrows5WEBDL1080pBaibaKo[NMClub]	71519BA2D14E26F77D66A5144A3256427BF4BB6A	10/30/2017
73.109.59.21	HeeSoftPack v3141 [ 08022015] 2015 PC	6D1AF0C8F6E1BB8F8783EA4A3CB73AE7F3D9B4BA	10/30/2017
73.109.59.21	Screenflow 90 Mac [Cracked]	80C692CEC49CF159659C0ED7574FCF6E70C2013C	10/30/2017
73.109.59.21	iTunes 105 Beta 6 Windows 32 Bit	1E25D449366F49610676B65D29D25221E7BB6670	10/30/2017
73.109.59.21	TechSmith Snagit v1221 Incl KeygenF4CG	4FA7BCB60F5A907AF32C14CC367CCB7BE5317E30	10/30/2017
73.109.59.21	Murder She Said 1961	0A16725F4C72A8DC9AABE0D8C7E213D8AC775C6D	10/30/2017
73.109.59.21	Archive Team Newsgrab 201608160128	2C4B438C0CBD7A914EA73B5D43BEBF1A2F73C3E4	10/30/2017
73.109.59.21	ABP629CMP4	A22323D1AFA32D3821DC0547E3FB3B03B6EA9AAF	10/30/2017
73.109.59.21	Matter of Time Vol 1 Unabridged Part 2 mp3	21CF51BAA2906DAF718DCFECD0D1D6D2D032F8EDB	10/30/2017
73.109.59.21	Bruttisporchiecattivi1976BDRipavi	3DA7C9B27CB57AD4B55F5C3D76FFB1BC6BE3F92A	10/30/2017
73.109.59.21	Remove WAT v2252 Windows 7 ActivationNEW	D0DA271229C7E8E611C09C58C0EB704409DB29BB	10/30/2017
73.109.59.21	12053012	280DCE2DAE0FB581AE979A5431F1C73C69C69D3D	10/30/2017
73.109.59.21	Chocolate Puma Step Back ft Kris Kiss 320 kbps [PsychOPath] mp3	CC36ABF7E4EC154FA87A96B4268FF62AC2C6D810	10/30/2017
73.109.59.21	Dry Erase Infinite VR Whiteboard	0A320E09B565EB1E79BB349B31A37B2B8A8C895D	10/30/2017
73.109.59.21	[katal]Ultra Iso 10522836 + Keygen	9D9EE2D6043CBAB5D1EE9C59F7751A0580EFD99A	10/30/2017
73.109.59.21	grandtheftautosanandreas804e9exe	D0A226D48F113E58A9E0BCA1765622A9A42F1531	10/30/2017
73.109.59.21	StandUp	01589955992F6C114A19227593725CF6A592DCE9	10/30/2017
73.109.59.21	how to stuff a wild bikini 1965	214CE3B014045F4411234A404F7E82F52C4365E1	10/30/2017
73.109.59.21	The Message 1977 1080p BluRay x264 AAC Ozlem	1C08653398F8DAF5948B5179F532A06A03663868	10/30/2017
73.109.59.21	Kaiba DVD	A8CF5CF666D57E50E5DD62079D89865F815E2425	10/30/2017
73.109.59.21	Operation Dumbo Drop 1995 [DVDRipXviD] [Lektor PL DTA26]	87BAF4B61E691D20A52E29F944486C8C79BBED38	10/30/2017
73.109.59.21	Kiss Of The Vampire 1963 BRRip XviD MP3RARBG	C290DDDBA8461B69F2026362E876A042745709C2	10/30/2017
73.109.59.21	EKDV324AVI	9BCD7A53B692522DADA2B54420FE61F596EF8333	10/30/2017
73.109.59.21	Over the Hedge 2006 720p WEBRip Hindi AAC2 0 x2645	AD00BD19C3EDF9A607038F7EEA7D47D6D4B76407	10/30/2017
73.109.59.21	Resident Evil Collection 20022012 BDRip 1080p Dual Audio Org BD 5 1 HindiEn	C7BEE6EE9810089083025D2A50F0647A157D05A8	10/30/2017
73.109.59.21	Pablo Escobar El Patron De Mal Episode 0110	4F03BD18BAFA0EC60B566E29DC6062EE54B00DF3	10/30/2017
73.109.59.21	MomS04E10HDTVrip1024X576mp4	A93A4BA21AC101B03D132DA3FA5CB2B8D243058B	10/30/2017
73.109.59.21	[katcr]nhl2015rs08decdetredwingsvwshcapitals720p60fpsntnikita	38BE12EF46F49B9D04790DF9588FA1983205F587	10/30/2017
73.109.59.21	MomS04E09HDTVx264LOLettv in Other by ettv16m10710M	12815109B1CD2159EB1D188B3B6E1FF04D3B415D	10/30/2017
73.109.59.21	BBC Secret Life of Birds S0f5 Designed for a Welsh Life XviD AC3	5AD7E484B2B57DAE92514E2A0D2A813FBC595859	10/30/2017
73.109.59.21	TheChallengeS30E03INTERNALHDTVx264YesTV	2A18FF7864AE595B070211D1D68015E1C12FAE48	10/30/2017
73.109.59.21	Ed Edd n Eddy 519 Tween a Rock an Ed Place XVID	9A9150BB2EBC4F38123E9C5AF14E06BBCB34493	10/30/2017
73.109.59.21	EuropeanChristmasMarkets1999HDTVx264CRIMSON	C4810E78B583616A937866069C540BDED1C25193	10/30/2017
73.109.59.21	NeoYokioS01E04WEBx264STRiFE[ettv]	D0F9F337C78E8112813938FBF8900EAE86C4BA4B	10/30/2017
73.109.59.21	The Ultimate Fighter Latin America S03E09 WEBDL H264 FightBB	BAC4FD0B10F034744E14A5E2816ED0DBCG67E5FD2	10/30/2017
73.109.59.21	Gordon Ramsay On Cocaine Series 1 1of2 720p HDTV x264 AAC mp4 [eztv]	6868EBC297128FA2801537DCE20597B16198A241	10/30/2017
73.109.59.21	BabyDriver2017HDRipXviDAC3EVO	2277A81195F880427F8D1F92A5A42FEA7E040862	10/31/2017
73.109.59.21	SpiderMan Homecoming 2017 HDTS x264CPG	337FE984E7EE4D32B18CF99F91BF09D351D5D2F3	10/31/2017
73.109.59.21	Gorillaz Discography Rarities 20012017 320kbps	1336867B049638125FA6EEFEBAC5DCE192AB6769	11/8/2017
73.109.59.21	MassEffect3N7DigitalDeluxeEditionSiMON 3xDVD5	EF426884EA0BEA3A0817CA79F3B8CA04C39B083BC	11/8/2017
73.109.59.21	La La Land 2016 1080p WEBDL 6CH 24GB ShAaNiG	2D3745459449ECA3F9E992E863DF4F6553E2C7F9	11/8/2017
73.109.59.21	The Emoji Movie 2017 XVID NOGrp	61863A5441498BBCE43D0485CB738C4E2D6F98D2	11/8/2017
73.109.59.21	The Nut Job 2 Nutty by Nature	5DE6BEBEC1F7BD2B03AB3EF9D3F7AAD32C55BC42B	11/8/2017
73.109.59.21	Valerian and the City of a Thousand Planets 2017 1080p WEBDL	DB39A3B67E17C2D45E4B1C0923192CDD55783B66	11/8/2017
73.109.59.21	The Night Shift Season 2 subs torrent	9918B79EF3FC1A1F606DA0DEE14FD5E0E5E07E1	11/8/2017
73.109.59.21	Microsoft OFFICE 2010 Pro Plus	27113327FBC680659464B72F63A2C1C644AC8EF8	11/12/2017
73.109.59.21	Book of Incredibly Useful Knots 200 Practical Knots for Sailors Climbers Campe	319A60E4A7E056B0D119B2C84B3998D0C6DFD983	11/14/2017
73.109.59.21	The Little Rascals 1994 1080p BrRip x264 YIFY	685B59922BDBA8B89E3AD96B1834C2A6058C6973	11/14/2017
73.109.59.21	Bon Cop Bad Cop 2 2017 [1080p] [YTS] [YIFY]	CA54357C5FEF5D32A57DA68F6ABAAEB49363E5F6	11/14/2017
73.109.59.21	Dunkirk19581080pBluRayH264AACRARBG	C661F84DA6A8AE7CE51650601EB5FBF7B20F10BE	11/14/2017
73.109.59.21	Missiles from Hell Battle of the V1 [1958 UK] WWII drama	4117AE088E5DF49B0CBEA491756F11884697DCA1	11/14/2017
73.109.59.21	Radius20171080pWEBDLDD51H264FGT	C23492116B6FAF9D80734F31D78E6BD034644D97	11/14/2017
73.109.59.21	Fast and Furious 7 2015 1080p HDRip x264 AC3 JYK movies	EE59B33AE0F697E6CD4FE0ACD6A0EDE4BFF2A83	11/14/2017
73.109.59.21	Undercover Grandpa 2017 720p WEBRip x264 ESub	C3955255C7DFB208BEFD49DB2F8E35A99F13ABC5	11/14/2017
73.109.59.21	The Gifted S01E07 HDTV x264SVA[ettv]	C7FD18CD44D2BF42882301DF1446F334E9E52B0F	11/14/2017
73.109.59.21	StarTrekDiscoveryS01E09540pCBSWEBDLAAC20x264AJP69[	AA105AE82E582EEA3E3C6D80369BC622CE18836E	11/14/2017
73.109.59.21	ScorpionS04E07HDTVx264SVA	F5003484DDC133F1A8090C44D25E857A658A925	11/14/2017

# Additional Evidence for IP Address 76.104.164.10

IP	Torrent Name	Torrent Hash	First Seen
76.104.164.10	Arrival 2016 DVDScr x2644RRIVED	B82EA7B29459677815A6DE00E207FF11E7121C1F	1/23/2017
76.104.164.10	The Girl on the Train 2016 720p WEBDL 850MB MkVca	6B3259297D7B29947FE2D9B39746FEC8F16279D0	1/23/2017
76.104.164.10	Rogue One A Star Wars Story 2016 HDTs x264CPG	1D448B110CB877416B1EE291AE26BA9C69623420	1/23/2017
76.104.164.10	Jack Reacher Never Go Back 2016 HC 720p HDRIP 1G	1B1687A20354E1D8C52D641C3CCAC2D5E40AF57F	1/26/2017
76.104.164.10	KuboardtheTwoStrings2016720pWEBRipx264AACETRg in Animation t	49776D0F1B66EF3EE4262BC9988E4DC04BAD1C80	2/5/2017
76.104.164.10	Collide 2016 720p BluRay 850MB NBY in Action by N	F8243C03C137CE7A17C3DA44B3F7A1AB423C4A4B	2/6/2017
76.104.164.10	Teenage Mutant Ninja Turtles Out of the Shadows 2016 720p WEBRip	82D59FBB29EC43F27AD3630AD5D8F696B7268746	2/8/2017
76.104.164.10	Aladdin 1992 720p BrRip x264 YIFY	064C9EB09D5F2580AB45F1B79C7F3A63A1B306C0	2/10/2017
76.104.164.10	The Lion King 1994 720p BluRay x264 500MB YIFY	195736862486EE89737F9876F9DC3A8CD794705A	2/10/2017
76.104.164.10	Alice Through the Looking Glass 2016 720p TC 950MB ShAaNiG in Adv	343215AEA77CFBEDB75CFC43B508DE55CD8DA16C	2/10/2017
76.104.164.10	Hacksaw Ridge 2016 720p WEBDL 1 2GB ShAaNiG	04CE7C06FFDD86CD18DEF65709834DC2E44D4699	2/15/2017
76.104.164.10	Resident Evil The Final Chapter 2016 HC 720p HDTc 900MB	9F9C6625FE5F0D75E1A3AE11B8C74FF2EDBB287B	3/1/2017
76.104.164.10	Captain America Civil War 2016 [1080p] [YTSAG]	89925FB48CAE260801F35FB7175530BF6E5E055A	3/9/2017
76.104.164.10	Logan 2017 720p HC TC 950MB NBY	AF6A664F9D455E9E4A07B2EA3E73FAB3A5C5E806	3/13/2017
76.104.164.10	Whiplash20141080pBluRayx264anoXmous	D08BFCB825BA168C73D1EEA20D8982CF35637A6B	3/13/2017
76.104.164.10	Incarnate 2016 720p BluRay 800MB ShAaNiG	123B541CC950FA9ADB667B20E51CBF112E3898A	3/13/2017
76.104.164.10	Assassinâ€™s Creed 2016 720p WEBDL 950MB MkVcAge	752658C41E91914D92B105152AC54151D6CA2A52	3/14/2017
76.104.164.10	Logan 2017 720p HDTs V2 x264 AC3CPG	98B40950A17AB644F155062D35DE471A933608DD	3/15/2017
76.104.164.10	Office Christmas Party 2016 720p WEBRip 750 MB iExTV	C42227F931192E1A9426C37D5EE8195E2B14F5F2	3/16/2017
76.104.164.10	ABBY FineReader 120101388 Corporated	989628B9B131E4C8C7FC02F1360EA0E8921228B5	3/19/2017
76.104.164.10	Patriots Day 2016 720p WEBDL 1GB MkVcAge	435F472AF95BE7C823A97EDFE9C42FE58949B38A	3/19/2017
76.104.164.10	Big Hero 6 2014 720p BrRip x264 YIFY	BB43CF1DC5B200BA37679DB96375A8190D933C2E	3/20/2017
76.104.164.10	Havenhurst 2016 720p WEBDL 800MB ShAaNiG in Horror by ShAaNiG	A17BC84D2BD86AE2999172B67DD4B381DFD0535	3/20/2017
76.104.164.10	Cell 2016 720p WEB DL 800MB ShAaNiG mkv movies	7137AF3CBA4CD0549186D0F1EDFCB503CA2390CF	3/20/2017
76.104.164.10	The Great Wall 2016 HC 720p HDRIP 750 MB iExTV	7567755C2D262EFEDBBF6EAA4CEA7B7D07D26456	3/20/2017
76.104.164.10	Rogue One 2016 720p BRIP 950 MB iExTV	C0D2E74350B9A73253EF0C1843B43965A7B7EBF0	3/21/2017
76.104.164.10	The Magnificent Seven 2016 720p YTS AG	2654480F1BD187024016281A344E5AB1D5548CF	4/5/2017
76.104.164.10	1Trolls 2016 720p WEBDL 850MB ShAaNiG 1000 in A	E9F0B6B36BEA84B43C6BCEB82BBECF3D21C3A3C2	4/6/2017
76.104.164.10	The Purge Election Year 2016 HC 720p HDRIP 900MB ShAaNiG mkv m	6438CCB78665172ABAB1D8473EAA900D881B72B2	4/6/2017
76.104.164.10	Family Guy S15E09 720p HDTV x264FLEET e2tv	63BBDCE3D3889E76ABFD6268EA7369A1D00AE81C8	4/6/2017
76.104.164.10	FamilyGuyS15E14HDTVx264SVA[e2tv]mkv	457C30E1BD1E977319BC71AD28148826B6F8A629	4/6/2017
76.104.164.10	Family Guy S15E09 HDTV x264FLEET	D66C92312287E8817DDE227C3C6203B2A6D3A4A1	4/6/2017
76.104.164.10	Family Guy S15E08 PROPER HDTV x264KILLERS	D964EFC4B711743FFC349D81AB6A6107515E76D0	4/6/2017
76.104.164.10	FamilyGuyS15E13HDTVx264SVAPRIME	08EDD02C4E7AD461141B4C602B84C05822E168B6	4/6/2017
76.104.164.10	FamilyGuyS15E17HDTVx264SVA[e2tv]mkv	CA8C950757ECB84180B87BC54931C248668CCBD3	4/6/2017
76.104.164.10	Family Guy S15E02 Bookie of the Year 480p x264 SCREENTIME in Fam	04F4A6B7EFD4AD21EC48D42D8518740F214996DA	4/6/2017
76.104.164.10	FamilyGuyS15E10HDTVx264FLEETPRIME in Other by Simm	693F155DE2A6EBC82CD5DBB862C8C30FF87553F6	4/6/2017
76.104.164.10	Eloise2017720pBRRipx264AACETRg in Horror by Ozlem1h71862MB18	8DA183FEA6790A5BB93DDF853668CB83AF83AF7A	4/7/2017
76.104.164.10	Split2016HC720pHDRIPx264ShAaNiGmkv	8193DFB7CE84147DEE4CCED1D1CF8F8DB5358082	4/7/2017
76.104.164.10	Deadpool 2016 [YTS AG]	A1D0C3B0FD52A29D2487027E6B50F27EAF4912C5	4/10/2017
76.104.164.10	Aftermath 2017 720p WEBDL 750MB MkVcAge	38C25F7BCDBCF11937AB670A32B1056FDB1D700A	4/12/2017
76.104.164.10	Sleepless2017720pWEBDL750MBMkVcAgemkv	4F7068FB388D325EB94FAC5A84FFABD5814C43	4/13/2017
76.104.164.10	Kong Skull Island 2017 HC 720p HDRIP 1GB ShAaNiG	BC6260EA06363B6D0B9FD637AFDAEC1FFAF65C6A	4/13/2017
76.104.164.10	BoykaUndisputed2016720pWEBRipAAC[2CH]H265[HEVC]GunGravE in	4022CCDB1F3FEE706B8D349FA93842E717784701	4/20/2017
76.104.164.10	Interstellar 2014 720p BrRip x264 YIFY movies hd	6E88B3F25BA49D483D740A652BF013C341BC5373	4/20/2017
76.104.164.10	Lawless 2012	D55E2B3D0051DC5BF7C85A7C09D6684E2EECF8C2	4/20/2017
76.104.164.10	TheGreatWall20161080pHCHDRipx264AC3EVO[EtHD]	E7D2DDF9AAAACD7A1D675AF00A44B59539AAED36	4/20/2017
76.104.164.10	The Devils Candy 2015 720p WEBRip 575 MB iExTV	9E35B7B4060D93BB983DC79C658BCBA11975A43A	4/22/2017
76.104.164.10	Batman v Superman Dawn of Justice 2016 Extended Ultimate Edition 7	B01B9CE7571FFEA17DACCEBE42F0E8334373AB64	4/27/2017
76.104.164.10	xxX Return of Xander Cage 2017 HC 720p HDRIP 750 MB iExTV	E47FFDBB56F2D4AD0E36EC627A01D721AC4F8CF5	4/28/2017
76.104.164.10	Brimstone 2016 720p WEBDL 1 1GB MkVcAge	589434AC4A7BC21A6059AA68DC75D77D39DEABD4	5/4/2017
76.104.164.10	Legend 2015 720p BRIP x264 AAC ETRG movies highres	755BD1A9C583523BED478D0CFC22EE8275F9521F	5/4/2017
76.104.164.10	Kingsman The Secret Service 2014 720p BrRip x264 YIFY movies highre	D60795899F8488E7E489BA642DEFBCE1B23C9DA0	5/7/2017
76.104.164.10	The Girl with All the Gifts 2016 720p HDRIP 850MB	EF6A2C6D154D38C1CF8DD06B18DFA11B2D6F0C60	5/8/2017
76.104.164.10	Banking on Bitcoin 2016 WEBDL 720p x264 600MB Gano	552CB28E2EFFDD668A433DDFDF82376083A7DE0E	5/11/2017
76.104.164.10	Stratton 2017 720p BRIP 900MB MkVcAge in Drama by MkVcAge42s	1C325CB826D24EFECDD72E36D8FDAC8EE668897B7	5/19/2017
76.104.164.10	The Great Wall 2016 720p WEBDL 800MB MkVcAge	00CC89B37970713218E08EC7BA414F1FDCB09E5B	5/23/2017
76.104.164.10	Fury (2014) 720p BrRip x264 - YIFY	0A3DA35B7925C58EB6D283E3F75CE8282AD7EE7D	5/23/2017
76.104.164.10	Kidnap 2017 720p WEBRip 675 MB iExTV	A36D7D3890C623324C5EE41938DB074BC4F78A1D	5/24/2017
76.104.164.10	Inferno 2016 720p WEBRip x264 AACETRg	9E3226AA823395ADC7D03F30E428BC2A7A2E8E97A	6/1/2017
76.104.164.10	John Wick 2014 720p WEB-DL x264[ETRG]	0A18229F50F6D1EBEF5341211F2FC720E011A81F	6/4/2017
76.104.164.10	OnceUponaTimeinVenice2017720pWEBDLx264M2Tv	9CD3B5E17B19740BCD9A2DEA0EFAD3C5ED0DBE43	6/19/2017
76.104.164.10	Colossal 2016 HC 720p HDRIP 999MB ShAaNiG	54930EBF00CD5CCEFB873C1AA3AA90698C152AAF	6/19/2017
76.104.164.10	Guardians of the Galaxy 2014 1080p BrRip x264 YIFY	11A2AC68A11634E980F265CB1433C599D017A759	7/3/2017

# Additional Evidence for IP Address 73.225.191.224



<u>IP</u>	<u>Torrent Name</u>	<u>Torrent Hash</u>	<u>First Seen</u>
73.225.191.224	Kidnap 2017 720p WEBRip 675 MB iExTV	A36D7D3890C623324C5EE41938DB074BC4F78A1D	5/26/2017
73.225.191.224	Office Christmas Party 2016 [720p] [YTSAG]	0C4DD3948F483299963902B7A5A1F13C2B0276F6	6/4/2017
73.225.191.224	The Lion King 1994 720p BluRay x264 500MB YIFY	1957368624B6EE89737F9876F9DC3A8CD794705A	6/9/2017
73.225.191.224	OnceUponaTimeinVenice2017720pWEBDLx264M2Tv	9CD3B5E17B19740BCD9A2DEA0EFAD3C5ED0DBE43	6/18/2017
73.225.191.224	Scrooged 1988 720p BrRip x264 650MB YIFY	CB997E6508F732E6FC5CC2F598E3CA0124967C3D	6/20/2017
73.225.191.224	Brave 2012 1080p BrRip x264 YIFY	4FFA45CE7350E7AA19C90A432089662DCD2621D5	6/24/2017
73.225.191.224	Rogue One 2016 720p BRRip 950 MB iExTV	C0D2E74350B9A73253EF0C1843B43965A7B7EBF0	6/26/2017
73.225.191.224	Jurassic World 2015 1080p BrRip x264 YIFY action	D6525C8CB07CBC6CE001A97541DAD408D4F1FFF0	6/28/2017

**EXHIBIT E**

## SACHVERSTÄNDIGEN-BÜRO FÜR COMPUTERWESEN PROF. DR. PAUSCH & PARTNER

Büro Darmstadt: 64289 Darmstadt, Heinheimer Strasse 38  
Tel: 06151/9712640 Fax: 06151/9712641  
Büro Kassel: 34277 Fuldabrück, An der Röthe 10  
Tel: 0561/95339100 Fax: 0561/95339101  
Büro Grünstadt: 67310 Hettenleidelheim, Im Park 9  
Tel: 06351/1359000 Fax: 06351/1359001  
Büro Pegnitz: 91257 Pegnitz, Reisach 16  
Tel: 09241/7359000 Fax: 09241/7359001  
Büro Wiesbaden: 65197 Wiesbaden, Geschwister-Scholl-Str. 26  
Tel/Fax: 0611/2046273  
Office Sydney (G+R IT-Experts): Level 6, Spring Street, 2000 Sydney NSW  
Phone: 02 82960492 Fax: 02 82960411

Report 140222/02

# Evaluation of the System *MaverikMonitor*

On behalf of

**Maverickeye UG (haftungsbeschränkt)**  
**Herrn Yanick Gabriel**  
**Heilbronner Straße 150**  
**70191 Stuttgart**

## Expert witness

**Dr. Simone Richter**

von der Industrie-und Handelskammer Darmstadt  
öffentlich bestellte und vereidigte Sachverständige  
für das Sachgebiet Systeme und Anwendungen  
der Informationsverarbeitung

COPYRIGHT © 2014, Dr. Simone Richter

This work is copyrighted by the owner. Each use, modification, public display, translation or duplication of any kind of method requires the written permit of the author.

### Data Privacy Declaration:

All information that were received for the purpose of preparing this report are stored on digital media. They will solely be used for the intended purpose described in this report.

## 1. Introduction

- 1.1 I was engaged as an expert by Maverickeye UG (haftungsbeschränkt) represented by Mr Yanik Gabriel, Heilbronner Straße 150, D-70191 Stuttgart, Germany.
- 1.2 I acknowledge that I have read, understood and complied with Practice Note CM7.
- 1.3 A copy of my CV may be found at appendix A of this report.

## 2. Instructions

- 2.1 My instructions were to provide answers to the questions set out below in relation to:

- (a) the software program known as Maverik Monitor Version 1.47 (**Software**); and
- (b) a system which monitors, detects and stores information in respect of data transfers of copyright material on the BitTorrent network of which the Software forms a part (**System**).

- 2.2 The questions which I was instructed to answer are:

- (a) Is the Software capable of accurately detecting and recording copies of data being shared from a Subscriber's IP Address taking place on BitTorrent networks?
- (b) How does the System function?
  - (i) Is there likelihood for erroneous information to be recorded by the Software?
  - (ii) Can the information recorded by the Software be manipulated by a user?
  - (iii) When the System engages in a BitTorrent transaction with a remote computer, is the System able to accurately record the IP address of the remote computer with the date and time?
  - (iv) What is the link between hash value and IP address, and does the System record this information accurately?
  - (v) What procedures are in place to ensure that the IP address recorded was allocated to the correct Subscriber at the time of the alleged copyright infringement?
  - (vi) What is the 'anti-leech mod' and how does it affect the System's reliability?
  - (vii) What are dynamic IP addresses and what effect (if any) do these have on the accuracy of the information recorded by the System?
  - (viii) What are hash collisions and how do they affect the accuracy of the information recorded by the System?
- (c) Does the System download from a source computer the full file?

### 3. **Source of Information and Scope of Work**

3.1 In preparing this report, I have reviewed and relied upon:

- (a) user documentation for the Software (**User Documentation**);
- (b) the source code for the Software;
- (c) my visual inspection at one of the data centers where the System's information is gathered and stored; and
- (d) the test results from the physical test conducted between 16 and 20 January 2014, to test whether or not the System was capable of detecting distribution of a known data set being five different movie files using the BitTorrent protocol.

3.2 For the purpose of this report, I have accepted the information provided to me as accurate, unless otherwise stated.

3.3 I worked independently in my analysis of the Software and the System as laid out in the in deriving my opinion set out in this report.

3.4 My opinions are based wholly or substantially on the specialised knowledge set out in my CV at Annexure "A" to this report.

3.5 I do not express any opinion about the accuracy of the information provided to me upon which my findings are based. The conclusions in this report depend upon the accuracy of that information.

3.6 If any information I have relied upon is found to be inaccurate or incomplete, or further information is provided to me, I reserve the right to revisit my findings.

3.7 This report makes use of technical terminology, an explanation of which is set out at paragraph 6 of this report.

### 4. **Assumed Facts and Limitations**

4.1 The NTP servers used by the System to calibrate its internal clock for the purpose of logging the date and time of alleged infringements are correct. The NTP servers are provided by local authorities and, as such, are trusted to distribute accurate time signals.

4.2 The hash value creation protocol for the copyrighted work and its sub-pieces is correct. As demonstrated with the five test files distributed over the BitTorrent Network.

### 5. **Summary of Findings**

5.1 In my examination of the System, I found that:

- (a) it is capable of monitoring traffic on the BitTorrent network;

- (b) it identifies the IP addresses of users and records the time of the data transfer accurately. This information enables ISPs to identify the Subscriber whose internet connection was used to conduct the alleged copyright infringement;
- (c) The System implements mechanisms to ensure that no erroneous IP addresses are collected by the System.
- (d) The System establishes connections with remote computers and receives and stores pieces of data from those computers which make content available across the BitTorrent network.
- (e) The received pieces of data are compared to a control copy using hash value comparison. If the hash value of the piece of data downloaded from the source is the same as the control copy, then the received pieces of data and the control copy are considered to be identical.
- (f) Dynamic IP addresses have no influence on the accuracy of the System logging and recording IP addresses and associated time stamp of infringement.
- (g) If the source computer's IP address changes during capture of a data transfer, no data is saved by the System, and therefore not used by Maverickeye UG.

## 6. Terminology

- 6.1 This report makes use of technical terminology. The technical terms used in this report are set out below.

### BitTorrent

- 6.2 The BitTorrent network is a type of peer-to-peer network. Peer-to-peer networks are a conglomerate of computers that link together to share information, files or data with one another through the use of specialised software (**P2P Network**). The users or computers on a P2P Network can either receive or send information, files or data to other computers (or undertake both functions simultaneously).
- 6.3 On P2P Networks, a connection is established between the users of the network who are online at the time. Each participating computer can perform both the function of a "client" (i.e. the receiving or downloading computer) and that of a "server" (i.e. the sending or host computer). The computers can then both send data to, and receive it from, each other's computers. The data is exchanged directly between the participating computers and is never stored in a centralised place. The data distributed may have various origins, but data exchange takes place exclusively between two individual computer systems.
- 6.4 Users need to take active steps to set up and install software to enable participation in the P2P Network. These steps cannot be 'accidentally' or inadvertently undertaken by a user. Any user wishing to participate in file sharing needs to install or actively start specialised software known as a BitTorrent client (**BitTorrent Client**). In order to do so, a user will need to download a



BitTorrent Client from a website that distributes BitTorrent clients. As part of the installation process, a user may configure the BitTorrent Client in accordance with his or her preferences, or adopt standard settings. A BitTorrent Client enables users to access a given P2P Network, such as eDonkey or BitTorrent. Some examples of BitTorrent Clients for the BitTorrent network include Azureus, BitComet and UT.

- 6.5 Once a user has installed the BitTorrent Client, the user may have an option to specify what is called the user's 'shared files' folder (**Shared Folder**) in which the user may place any files. Files placed in the Shared Folder are made available and may be distributed to other users requesting that file.
- 6.6 A user will then need to conduct a search of torrent files related to the data he or she wishes to acquire. Such data often includes copyrighted works such as films, television shows and music. Websites such as "The Pirate Bay" may be used to search for and obtain the relevant torrent files, as they offer torrent files and magnet links for download. The user then needs to download those torrent files and open them in their BitTorrent Client.
- 6.7 The BitTorrent network splits or separates a complete file, being for example, a movie or song (**Complete Data Set**) into pieces to enable efficient distribution to participants. Those pieces may be further broken down into sub pieces. When those pieces are reassembled, they constitute the Complete Data Set.
- 6.8 Once a user opens the torrent file in their BitTorrent Client, the BitTorrent Client queries the peers to which it is connected in order to ascertain which pieces of the Complete Data Set those peers have available to download. Some peers will have the Complete Data Set, and are known as "seeders" (**Seeders**). Other peers may have less than the whole file because they are still in the process of downloading it, but they will still be able to share the pieces that they have.
- 6.9 Over the time of downloading the Complete Data Set, pieces are requested and received by the BitTorrent Client from various other peers and are ultimately assembled together like a large jigsaw into the Complete Data Set. If, for example, the Complete Data Set is a film file, the film file will at this stage be in a state in which a user can view it.

#### IP address

- 6.10 An Internet Protocol (**IP**) address is an address which identifies a computer within an IP network. It is comparable to a postal address in the sense that it enables computers to exchange data with each other. The commonly used "IPv4" address consists of four numbers (values 0-255) separated by a dot. In computer terms it is a 32 bit large binary number.
- 6.11 There are more computers connected to the internet than available IPv4 addresses. To ensure that the information sent from another computer reaches the correct addressee, a dedicated technology is used called "Network Address Translation" (**NAT**).



- 6.12 Using NAT, an internet access point has at least one worldwide unique IP address. The internet access point is often a router or a digital subscriber line (**DSL**) access point. This type of equipment is used to connect computers within an internal network. They are commonly found within households or businesses.
- 6.13 Each device connected to the internal network may have its own IP address assigned by a router. In circumstances where an internal network is present, the IP address logged by the Software will identify subscriber's internet access point only. That is, the IP address assigned to the router or DLS access point to which a number of computers can be identified.
- 6.14 It is not possible to determine if an internal network is present unless inquiries are made with the internet connection owner. There could very well be one computer connected to the router.

#### Dynamic IP address

- 6.15 An Internet Service Provider (**ISP**) has control of a large number of IP addresses. It assigns IP addresses to its account holders (**Subscribers**) in order to provide internet connections. An internet connection cannot function without an IP address.
- 6.16 The ISP may have more Subscribers than they control IP addresses. If this is the case, it may not assign fixed static IP addresses to its Subscribers.
- 6.17 An ISP may assign 'dynamic' IP addresses to its Subscribers. A dynamic IP address is only assigned for a limited time period. This period may vary from ISP to ISP. The time period could be up to six months or more and is dependent on each ISPs own internal policy.
- 6.18 Due to the nature of dynamic IP addresses, in order for ISPs to identify Subscribers from data logged by the System, two data points must be known: time of the data transfer and the associated IP address. Using this information, an ISP may cross-reference IP address, date and time with its Subscriber database.

#### Hash Values

- 6.19 An algorithm that correlates data of variable length to data of a fixed length is called a hash function. The value returned by the function is a hash value.
- 6.20 Two different sets of data may be compared using hash values. They are commonly referred to as digital fingerprints. They allow large quantities of data to be represented by a relatively small number of bytes. The determination of a hash value of a data set and the comparison of two hash values is more efficient than a byte-wise comparison of two files. The System uses hash value comparison to determine if two sets of data are identical.
- 6.21 For example, two different movies will have two different hash values. Furthermore, every piece of the movie will also have its own hash value.
- 6.22 There are various methods used to calculate hash values. The most commonly used hash value calculation method is called MD5. This method is known to have a mathematical "defect".

There is a possibility of creating the same hash value for two different sets of input data. If this occurs one calls this a hash collision. This method is not used by the System.

- 6.23 The second most applied method is called SHA-1. It is theoretically vulnerable to hash collisions, but so far there is no method known to create a hash collision. The method known to be collision free is called SHA-512 and the third most commonly used.
- 6.24 The P2P Network allocates a hash value to each file that is made available for sharing, so it can easily be identified by the P2P Network participants.
- 6.25 The System uses the SHA-1 and SHA-512 methods. The System uses SHA-1 as BitTorrent uses this to identify data. SHA-512 is used internally by the System to verify the downloaded sub-pieces against a control copy of data.
- 6.26 The Software uses hash value comparison to determine if two sets of data are identical. Accordingly, if two SHA-1 or SHA-512 hash values are the same, the data compared is said to be identical.

#### NTP Servers

- 6.27 A Network Time Protocol (NTP) server, or NTP Stratum-1 servers, is a networking protocol which synchronises all computers on an NTP server to within a few milliseconds by reference to Coordinated Universal Time (UTC), which is the primary time standard by which the world regulates clocks and times.
- 6.28 There are difference sources for UTC, such as the Global Positioning System and WWV, a radio station which continuously transmits official U.S. Government frequency and time signals. Both of these sources of UTC provide accurate time.

#### Module

- 6.29 A module is a part of a computer program which carries out a specific function and may be used along or in combination with other modules in the same program.

#### Data Structure

- 6.30 A data structure is the location where data is stored in a program. There are several different types of data structures which are capable of storing different types of data. If the data structure is not created for a particular type of data, then it will be unable to store that data.

#### Transport Control Protocol/Internet Protocol

- 6.31 The IP address attributes to a computer a unique reference number. By this number a computer is identified. The IP does not facilitate the transfer of data itself; therefore the Transport Control Protocol (TCP) was invented. It is a set of rules used along with the IP to send data in the form of message units between computers over the Internet.

## 7. Method of Work

7.1 I examined and reviewed the User Documentation of the Software and the complete source code of the Software, line by line, and the scripts therein. In addition I set up files within the Bit Torrent network to be shared and downloaded by various users to determine if:

- (a) the System accurately monitors BitTorrent traffic;
- (b) the System's BitTorrent Client initiates a TCP connection with the source computers (as explained in paragraph 8.2 below);
- (c) the System accurately captures the IP address, together with time stamp and the port number used by the source computer when a data transfer between the Software and source computer is successful;
- (d) the System records the hash value of the data received from the source computer; and
- (e) the System accurately calculates the hash value of the sub-piece received from the source computer for the purposes of conducting a comparison with it and the reference file (a copy of the data set known to be a complete copy of the copyrighted work made available on BitTorrent networks).

7.2 I analyzed the source code of the Software line-by-line in order to ascertain:

- (a) the way in which data identified by the Software is processed;
- (b) the correctness of the various Data Structures containing the data identified; and
- (c) whether it correctly stores the data in the Data Structures and extracts the correct information from the data structures to ensure proper identification and comparison of hash values.

7.3 Finally, I examined the source code of the Software to evaluate the consequences of potential errors, including:

- (a) buffer overflows, which occur when data is being stored in the Software's module to capture amongst others the data set of IP-addresses, date, time and duration of the possible copyright infringements and the capacity to store the data is exceeded;
- (b) wrong variable handling, which can occur, for example, when the Software is expecting a variable (i.e. a location where temporary data is stored) to contain an integer number but instead it contains a string of text and is therefore unable to process the variable; and
- (c) logical errors resulting from bugs which cause the Software to operate incorrectly and produces an unintended or undesired output.

## 8. **Live Tests performed in the BitTorrent Network to test the System**

- 8.1 I was asked by Maverickeye UG to test the System for accuracy by distributing Complete Data Sets using the BitTorrent Network. The purpose of this test was to conclude whether or not the System was capable of detecting distribution of a known Complete Data Set using the BitTorrent protocol.
- 8.2 This test was designed to be a real life test which allowed different users or peers to share data with the System.
- 8.3 I was given permission by the copyright owners of the Complete Data Sets distributed in the live scenario to use the Complete Data Sets in the tests described below.

## 9. **Test implementation**

- 9.1 I informed Maverickeye UG of the time period that the tests would take place. I did so to ensure that Maverickeye's System was in operation during the time required to conduct the test. I also informed Maverickeye UG of the names of the files I was using as part of the test, so they would know which files to search for. I did not inform Maverickeye the precise point in time the downloading/uploading of the Complete Data Sets would occur. The test was performed between January 16<sup>th</sup> and 20<sup>th</sup> 2014 (**Test Period**).
- 9.2 In undertaking the test, I completed the following steps.
- 9.3 First, I uploaded four Complete Data Sets to my desktop computer. The Complete Data Sets used in the test were the following files:
- (a) prepare-loopdevices.exe, being an executable file (i.e. software that causes a computer to perform tasks);
  - (b) AVI\_0002.AVI, being a file containing both audio and video data;
  - (c) AVI\_0004.AVI, being a file containing both audio and video data; and
  - (d) Vorlesungen.zip, being a compressed file containing multiple pdf files.
- (together **Test Data Sets**)
- 9.4 Second, I created a torrent file in respect of each of the files in the Test Data Sets using the following BitTorrent clients:
- (a)  $\mu$ Torrent version 3.3.2;
  - (b) KTorrent version 4.2.0 and 4.3.1; and
  - (c) Transmission version 2.82.



9.5 When creating the torrent files, I had to include a tracker address. The tracker address is what announces that the file is being made available and can be accessed by those using the BitTorrent network.

9.6 The trackers used for each of torrent files are set out below:

udp://tracker.openbittorrent.com:80/announce

udp://tracker.publicbt.com:80/announce

9.7 Third, during the Test Period, I used two mobile devices, named Samsung Mobile Device 1 and Samsung Mobile Device 2, to download the torrent files for each of the files in the Test Data Sets. Both of these devices are Samsung Tablets and each have internet connections provided by different ISPs and each have different IP addresses.

9.8 At the time of each download on each of the Samsung Tablets, I noted down the following information:

- (a) the device being used, that is Samsung Mobile Device 1 or Samsung Mobile Device 2;
- (b) the particular file being downloaded, e.g. prepare-loopdevices.exe;
- (c) the IP Address of the device being used to download the file;
- (d) the date on which the download commenced; and
- (e) the time at which the download commenced.

A copy of the information that I have noted down in respect of the data transfers is set out in Schedule 2 to this Report.

9.9 I ascertained the date and time of the commencement of the download by monitoring my BitTorrent Client and noting the time at which the download appeared to commence on the BitTorrent Client.

9.10 I ascertained the IP address of each device by going into the settings of each device, where the IP address of the device is stated.

9.11 I was aware of each of the ISP providing the internet connection for each of the Samsung tablets, because I contracted with each ISP in relation to each device. In any event, using the IP address, it is possible to perform an internet search to obtain the ISP which owns the IP address.

9.12 After the termination of the test, Maverickeye UG provided me with an extract from their database, which had detected and stored information in respect of the data transfers which occurred during the Test Period.

9.13 I then compared the information I had noted down about the data transfers, with the information extracted from Maverickeye UG's databases.

9.14 An example extract of the System's database provided to me by Maverickeye UG is set out below. This extract is the information obtained by Maverickeye UG in relation one download by a user of the prepare-loopdevices.exe file. Each second line gives a short explanation of the meaning of the database entries.

<b>ExportId</b>	4771520570
	Unique number assigned automatically by the System
<b>ExportTs</b>	2014-01-16 16:44:22
	Timestamp of the export into the System's database
<b>ClientInformationId</b>	11313558141
	Unique number assigned to the user
<b>Date</b>	2014-01-16
	Date of the data transfer
<b>Time</b>	15:32:32
	Time of the data transfer
<b>ClientProto</b>	Bt
	Name of the protocol used in the data transfer. Bt means BitTorrent Protocol.
<b>ClientIp</b>	109.85.95.91
	IP Address of the user downloading the file
<b>ClientPort</b>	55980
	Port number used for the data transfer
<b>ClientDhtPort</b>	6881
	Special Port number used within the data transfer
<b>ClientUserName</b>	
	The username of the particular user with their ISP (unknown by Maverickeye UG)
<b>ClientUserHash</b>	2D4241333330302D9676CEC37D543F1A69838FD6
	Hash value
<b>ClientVersion</b>	-BA3300-
	Version of the Bit Torrent Client used
<b>FileName</b>	prepare-loopdevices.exe
	Name of the downloaded file
<b>TrackName</b>	prepare-loopdevices.exe
	Name of the part of the downloaded file
<b>FileHash</b>	8AAE50E22398E28AC4F20E5460A312B95E693F3A
	Hash value identifying the file
<b>FileSize</b>	16683
	Size of the file in bytes
<b>BtBitField</b>	0
	Value indicating the piece to download
<b>Geolpisp</b>	Vodafone D2 GmbH
	Name of the Internet Service Provider (ISP)

<b>GeolpOrg</b>	
	Information about the ISP
<b>GeolpCity</b>	Andernach
	City where the ISP is located
<b>GeolpZip</b>	
	Post code of the city where the ISP is located
<b>GeolpCountry</b>	DE
	Country where the ISP is located. DE means Germany.
<b>GeolpRegion</b>	Rheinland-Pfalz
	Further information about the location of the ISP
<b>GeolpLon</b>	7.4
<b>GeolpLat</b>	Geographical coordinates of the ISP location 50.4333 Geographical coordinates of the ISP location
<b>SessionStart</b>	16/01/2014 3:31:58 PM
	Date and Time of the start of the detection of the download (UTC)
<b>SessionEnd</b>	16/01/2014 3:33:34 PM
	Date and Time of the end of the detection of the download (UTC)
<b>TransferStart</b>	16/01/2014 3:32:31 PM
	Date and Time of the end of the transfer (UTC)
<b>TransferEnd</b>	16/01/2014 3:32:32 PM
	Date and Time of the end of the transfer (UTC)
<b>SessionDuration</b>	96
	Duration of the session in seconds
<b>LoggerId</b>	clientng13
	Unique number of the logging process
<b>LoggerIp</b>	787014805
	IP number of the logging computer
<b>LoggerCountry</b>	DE
	Country where the logging computer is located
<b>LoggerLon</b>	8,4287
	Geographical coordinates of the logger's location
<b>LoggerLat</b>	49,0019
	Geographical coordinates of the logger's location
<b>TotalPeers</b>	0
	Number of additional peers
<b>UniqTs</b>	2014011615
	Another time stamp indicating the beginning of activity within the program. e.g. 16 Jan 2014 at 3pm (being 1500 hours).
<b>RelatedTitleId</b>	6467
	Internal unique number identifying the file
<b>OwnerId</b>	3668
	Internal unique number identifying the owner of the file



VerifyPartOk	YES
	Indicates whether the comparison of the data against a control copy was fine
ExporterVersion	2.5
	Version number of the Module forming part of the System used to export the data into the secure database
ExporterBinCRC32	c0dcf654
	The value assigned by a cyclic redundancy check <sup>1</sup> to the data transferred to the database. Upon retrieval of the data from the database, the cyclic redundancy check is repeated and if the two values match, then it can be assumed that the data is correct and has not been corrupted.

9.15 The System database extracts provided to me by Maverickeye UG are set out at Schedule 3 to this Report. These extracts set out all of the downloads of the Test Data Sets during the Test Period.

9.16 The data shown in the table above is extracted from row 5 of the file "6467 – Prepare-loopdevices.xls" of Schedule 3. This data correlates with the data I noted down in Schedule 2 at the tab titled "Prepare-loopdevices", that is, the ISP name, IP address, data and times of distribution correctly matched.

9.17 I can verify that the information that I noted down in Schedule 2 correlates with the data provided to me by Maverickeye UG.

9.18 It is my conclusion that the System is able to accurately detect data transfers on the BitTorrent network when deployed to do so.

## 10. Inspection of the data center

10.1 I visited the data center where the System was running.

10.2 The purpose of my visit was to check that data was stored securely and could not be tampered with. From my inspection, I am confident that the safety measures put in place provide sufficient security to ensure that the data collected by the System is secure.

10.3 I also confirm that write once read many (**WORM**) tape drives are used to store data collected by the System in a secure manner. WORM technology provides non-editable data storage such that any data stored by the System cannot be altered, overwritten or corrupted.

## 11. Answers to the Questions

11.1 The opinions set out below are based wholly or substantially on the specialised knowledge referred to in appendix A.

<sup>1</sup> Mathematical method developed by W. Wesley Peterson, 1961.

**Is the Software capable of accurately detecting and recording copies of data being shared from a Subscriber's IP Address taking place on BitTorrent networks?**

- 11.2 Based on my examination of the source code presented and the tests performed, the System correctly detects and records instances of copies of data being shared from a Subscriber's IP address on the BitTorrent networks.
- 11.3 It accurately records the IP addresses, port numbers, time stamps and the SHA-512 hash value of the sub-pieces received by the System in a secure database.

**How does the System function?**

- 11.4 The Software consists of various modules. Each of the modules has a distinctive task including (but not limited to) tracking IP traffic, calculating hash values and recording the correct time.
- 11.5 When the System is initiated, it checks the operating system, interfaces, clock and memory on the computer on which the Software is installed for potential errors. If any potential errors are identified, the Software and thus the System does not function.
- 11.6 The System ensures that an accurate time is used by calibrating its local clock with various NTP servers. The System uses amongst others, the time signals distributed by the Physikalisch-Technische Bundesanstalt (the German national metrology institute).
- 11.7 The System captures all data packets being transmitted between the local BitTorrent Client and a remote one. Once the local BitTorrent Client receives information about the availability and location of distributed data, it will initiate communications with those locations.
- 11.8 A TCP connection is then initiated by the local BitTorrent Client in order to inform source computers that the System is interested in acquiring data. Once transfer begins, all data traffic is accurately recorded with information such as time of the data transfer, IP addresses, port numbers, and if the parties in the TCP connection wish to send or receive data. If a data transfer between the System and remote computer is successful, the IP address is logged, together with time stamp and the port number used by the source computer.
- 11.9 Information is logged by the System only if the TCP connection is active two seconds before and after the data transfer. This ensures that users participating in transactions for a lesser period of time are not logged. This adequately addresses the issue of a dynamic IP address changing.
- 11.10 The hash value of the transmitted sub-piece is also recorded by the System.
- 11.11 Once the connection between the System's local BitTorrent Client and the source computer is closed the data captured is transferred to a secure database. The storage medium is a write-once read only. The database is backed up once per day. The backup carries a time stamp and is secured by a digital signature.

**Is there a likelihood for erroneous information to be recorded by the System?**

- 11.12 It is impossible for the System to record erroneous information. The System uses the TCP protocol to establish a communication channel with source computers. By design, the connections established are valid. If a TCP connection is not initiated between the System and source computer then no data is logged.
- 11.13 The System also checks the hash values of all sub-pieces received to ensure they are part of the full file.
- 11.14 If any technical problems or errors, including those described at paragraph 7.3 above, occur during the data capture and logging process, the relevant process is terminated and data captured during that process is not transferred to the secure database. This means that all data transferred to the secure database and stored by the System is error free.

**Can the information recorded by the System be manipulated by a user?**

- 11.15 This may be possible in limited circumstances where an individual has access to the database and the backup files with the required security clearance and the possession of the key to the digital signature.
- 11.16 The risk of database manipulation is mitigated as the database records all access to it. Those records may be used to trace unauthorised access to the user account responsible. As an added security measure, the backup files are secured by digital signatures.
- 11.17 The System saves all network traffic between the system and the remote computer. Manipulation of this without detection is difficult to accomplish given the security measures in place.
- 11.18 I consider the above stated limited circumstances are impossible to achieve.

**When the System engages in a BitTorrent transaction with a remote computer, is the System able to accurately record the IP address of the remote computer and date and time?**

- 11.19 The System is able to accurately record the IP address and the associated time stamp.
- 11.20 When a remote computer offers to distribute a piece of data to the System, both parties must establish a secure end-to-end connection using the TCP/IP protocol. When a transfer takes place, the IP address of the remote computer is logged by the System.
- 11.21 NTP servers ensure that the System receives accurate time information. This allows the System to accurately calibrate its clock. The System uses its clock to produce data transfer time stamps.
- 11.22 Using an IP address and associated time stamp of the data transfer, an ISP may correctly identify the Subscriber allocated that IP address at a specific time by searching databases in its possession. Most ISPs will operate a data retention policy. This means that the information



sought may be deleted after a period of time. It is therefore important for copyright owners who allege that the data transfer captured by the System contains copyrighted material to obtain disclosure of the names and addresses behind the IP addresses before such deletion occurs.

**What is the link between hash value and IP address, and does the System record this information accurately?**

11.23 When a remote computer responds to the local client's request for data, the remote computer will begin to transfer a sub-piece of the requested file. This data transfer is monitored and recorded by the System. Once the complete sub-piece is received successfully by the System, a record in the database is created documenting that transaction.

11.24 The database record contains all information relating to the transaction between the System and source. That information includes the following:

- (a) IP address of the sender;
- (b) IP address of the System;
- (c) port numbers used for the transfer;
- (d) time stamps for:
  - (i) the start of the conversation;
  - (ii) the end of the conversation;
  - (iii) the start and end of the download;
- (e) the SHA-512 hash value of the data received from the source computer; and
- (f) the position of the sub-piece in the complete file.

11.25 Once the above information has been logged, a hash value comparison is initiated by the System. The hash value of the sub-piece received from the source computer is calculated and compared to the hash value of the complete data set of the copyrighted work stored in a reference file. If the hash values and positions are the same, the System establishes that the downloaded sub-piece must have been part of the copyrighted work. In my opinion, this is the correct finding to make in the circumstances.

**What procedures are in place to ensure that the IP address recorded was allocated to the correct Subscriber at the time of the alleged copyright infringement?**

11.26 The Subscriber may be identified with the assistance of the ISP responsible for the allocation of that IP address. Only the ISP stores this information. Without the ISP's assistance, a copyright owner cannot identify the Subscriber.

11.27 In the case of dynamic IP addresses, various Subscribers may have the same IP address – but during different time periods. This is the reason it is important that the correct time stamp is recorded accurately by the System once an infringement of copyright is detected.

- 11.28 To ensure a correct time stamp the System synchronizes its time with NTP servers, which allows the System to produce accurate time stamps.
- 11.29 Logs with more than a 10 milliseconds time difference are not exported by the Software for use as evidence in legal proceedings, as these have the possibility of introducing potential inaccurate logs into the database. This scenario is avoided altogether by rejecting such logs. In my opinion, these safety protocols ensure that the Software produces accurate time stamps.
- 11.30 As the System establishes a connection to the source for at least 2 seconds after the successful data transfer, the accuracy of the time stamp recorded for the data transfer is valid.

**What is the 'anti-leech mod' and how does it affect the System's reliability?**

- 11.31 Within a P2P Network, users exchange data amongst themselves. A BitTorrent Network is a type of P2P network. It relies on the willingness of all participants to share their data. If a client is not sending data it will be marked as a 'leecher'. The System does not log users known as "leechers". A leecher is a user who does not act as a data source. The System only enters into transactions with those users who engage in the distribution of data. In other words, the users logged by the System have not only made available data, but also engaged in an actual transaction with the System and has been recorded distributing a piece of the data.
- 11.32 In the operation of the System, the local BitTorrent Client is created in a way which ensures that it never transfers pieces of copyrighted files to other users. Instead, the client in the System mimics a user willing to act as a source of data but no actual transfer takes place. It does not affect the accuracy or reliability of data logging by the System.

**What are dynamic IP addresses and what effect (if any) do these have on the accuracy of the information recorded by the System?**

- 11.33 An explanation of dynamic IP addresses may be found in section 6. In summary, an ISP may assign an IP address to different Subscribers at different periods of time. But as the time of the data transfer is recorded accurately by the System, an ISP is able to determine which Subscriber it assigned an IP address to at a particular moment in time using the IP address and time stamp.

**What are hash collisions and how do they affect the accuracy of the information recorded by the System?**

- 11.34 A hash collision occurs when two different data sets have the same hash value. The System uses the SHA-512 method to determine the hash value of the sub-piece transferred.
- 11.35 There are two potential sources of hash collisions:
- (a) Trivial hash values, being:
    - (i) hash values calculated from a file containing either bit values of 0 or 1 or the same data in each block; and

(ii) bit patterns that describe the type of the file transferred.

The System checks the hash values against a blacklist and other trivial data sets. Data transfers involving these hash values are deleted by the System and are not logged.

(b) Hash collisions for the complete file and a sub-piece

The System identifies files by their name and SHA-1 hash value. It checks the value of the SHA-512 hash value of the downloaded sub-pieces against the calculated SHA-512 hash value of the reference file. To perform this calculation the position of the sub-piece must also be known. The probability of the same data of two different files being at the same place is extremely unlikely. This means that where the hash value and location match, it may be said that distribution of the relevant data set took place.

11.36 Thus, in my opinion, the System addresses the risk of trivial hash collisions and treats them correctly by not recording the transaction.

**Does the System download from a source computer the full file?**

11.37 The connection with a source is terminated after the System receives a sub-piece of the copyrighted work from the source. The System may connect with the same source again in relation to another sub-piece of the same work. However, the System does not acquire the whole file from a single source. This is not necessary or always possible.

11.38 However, each user does make the Complete Data Set available for download to other users. While it is possible for a user to make only one piece of the Complete Data Set available, this is extremely unlikely, as the user would need to possess highly specialised information technology skills to split a Complete Data Set into several pieces and make each piece available for download separately. This is also highly unlikely because users on the BitTorrent network are using BitTorrent network to download and make available Complete Data Sets, such as complete movies.

11.39 Users of BitTorrent networks seek to acquire various files. These may include copyrighted works such as movies, software and music. In relation to movies, the intention of a user is to acquire a full copy of a movie. It would be nonsensical to acquire only one piece, which may only be a few random seconds of the movie. When a user acquires software, it is unlikely that the software will function properly or even install if it is incomplete. A user therefore needs to acquire the Complete Data Set for the software in order to use it. Furthermore, in relation to music files, it is inconceivable that a user will only seek to acquire a random few seconds of a musical work.

11.40 BitTorrent users have little control over which pieces they acquire first. They acquire the pieces that are available and offered by other users. For these reasons, it is reasonable to say that

those wishing to acquire a file will participate in a BitTorrent network until the Complete Data Set is acquired.

11.41 A user who has acquired the Complete Data Set will continue to transmit pieces of that file to other users unless the client is instructed to stop doing so. It is not uncommon for users to continue distributing the files for long periods of time.

11.42 A user without the full data set will request the pieces it does not have from other sources. These transmissions may take place while that user is transmitting data to the System. Accordingly, the possession and distribution of a sub-piece is a very strong indication that the user is or will in the future be in the possession of the complete data set.

11.43 The reason why P2P Networks work so quickly and effectively is because different parts of a movie are obtained from different users until an entire film is downloaded. That is, when downloading a movie the user's computer may simultaneously download the movie from a number of different other peers' computers.



## 12. Declaration

I, Dr Simone Richter, declare that I have made all the inquiries that I believe are desirable and appropriate and that no matters of significance that I regard as relevant have, to my knowledge, been withheld from the Court.

Signature..........Date.....*2 April 2014*.....



**Dr. Simone Richter**  
permanently sworn in and officially installed  
expert witness for Systems and  
Application of Information Technologies.  
Officially supervised by the  
Chamber of Commerce in Darmstadt

## Appendix A

# Curriculum Vitae

Name: Dr. rer. nat. Simone Richter

Born: December 13, 1969 in Berlin, Germany

### Career Summary

Over the past 15 years of professional experience, I have gained extensive knowledge and expertise in the following areas:

- General and extended IT-knowledge
- Company Administration (Finance, Controlling, Human Resources, Technology Transfer, Legal, Site & Buildings, Risk Management, Quality Management, Procurement and Contracts)
- General Project Management
- Strategy Development and Deployment
- Change Management
- Technical Project Management
- Project Team Management
- ERP Project Management
- Project Evaluation
- Particle Accelerator Design and Operations

Due to my training and experience, I have specialised knowledge in all areas of I.T including computer hardware, software, data centres, networking and database management.

Since January 2003, I have provided independent expert witness testimony in Germany as an accredited I.T. expert. This accreditation is provided by the German government to individuals who demonstrate through rigorous testing, that they have the qualifications, training and experience to provide expert opinions and Court approved reports for the benefit of the Court in the field of IT.

### Education / Training

- |                |   |
|----------------|---|
| 2010 –<br>2011 | Malik Master of Management, MZSG St. Gallen, Switzerland                                      |
| 2008 –<br>2010 | Certificate, Helmholtz-Akademie für Führungskräfte – Helmholtz<br>Management Academy, Germany |

2002 – Certificate, Medical Physics and Technics, University of Kaiserslautern,  
2005 Germany

2001 Dr. rer. nat. - PhD, Technical University Darmstadt, Germany. My PhD

1996 Diploma –Master with Thesis in Physics, Technical University Darmstadt,  
Germany. My diploma involved writing approx. 8,000 lines of code

1988 Abitur – university-entrance diploma , Göttenbach-Gymnasium, Idar-  
Oberstein

#### Certifications and Accreditations

2009 – Member of the Lenkungsausschuss Helmholtz-Akademie für  
Führungskräfte(Steering Committee of the Member of the Selection Committee for  
the Helmholtz-Gemeinschaft Deutscher Forschungszentren e.V. (Helmholtz Associa-  
tion - HGF) Mentoring Program

2009 – 2010 Elected Member of the GSI Wissenschaftlicher Ausschuss (internal scientific council)

2008 – 2010 Elected Deputy Chairwoman of the Wissenschaftlich-Technische Räte-Versammlung  
of Helmholtz-Gemeinschaft Deutscher Forschungszentren e.V. (HGF) (Committee of  
scientific-technical councils)

2006 Member of the Working Group "Strategy of the Helmholtz Gemeinschaft"

2005 – 2008 Chairwoman and Elected Member of the GSI Wissenschaftlicher Ausschuss

2004 – 2005 Member of the Internal Advisory Committee for the Definition of the Structure of the  
FAIR Project

2003 – 2004 Appointed Member of GSI Wissenschaftlicher Ausschuss

2003 Accreditation as expert witness (permanently sworn in as public officer) with formal  
knowledge examination according to German law §36 GewO re-certified and re-  
newed oath

2005, 2010 My involvement at the GSI's internal scientific council and later on also within the  
committee of scientific-technical councils at the HGF gave me the opportunity to  
work on the steering level of the organizations. The boards I led as chair or depu-  
ty chair are asked to give strategic advice to the managing and governing boards  
of the respective organizations. I gained a deep insight in decision making pro-

cesses with high profile stakeholders such as ministries or other representatives of large research organizations.

## **Work History**

### **2003 – Present**

In January 2003 I was formally sworn in as a public officer as an expert witness in all matters related to Information Technology. In this position, I am regularly called to provide technical expertise for Courts, public prosecuting offices and private organizations as an independent expert for the Court.

Prior to my accreditation, I was required to demonstrate my IT knowledge, by working on 10 different cases with another IT expert. After this, I was required to undertake a two day test which involved a written component in respect of General IT knowledge including hardware, software and operating systems, and then a practical component in which I was interviewed and my technical knowledge was tested by a 3 person panel. Upon passing these tests, I was recommended by the Darmstadt Chamber of Commerce to be accredited as an independent expert. Constant training is required to be reaccredited every 5 years. The chamber of commerce in Darmstadt, Germany serves as my supervising agency on behalf of the German government. Currently only approx. 140 individuals in Germany hold this accreditation.

### **Key Achievements**

- Giving technical expertise reports and testimonies in civil court cases
- Providing IT-related expert opinions and court approved reports in private cases

### **General Responsibilities**

- Working with judges, lawyers, plaintiff and defendant representatives to solve court cases
- Providing Companies with technical background information about IT-project statuses
- Evaluation of IT-project statuses
- Acting as public office for (IT) technical questions in and before court cases

**2011 – Present      GSI Helmholtzzentrum für Schwerionenforschung GmbH; [www.gsi.de](http://www.gsi.de)**

**Interims Manager**

**In-house Consultant and Strategic Advisor to the Administrative Managing Director**

GSI GmbH as member of the German Helmholtz-Association ([www.helmholtz.de](http://www.helmholtz.de)) provides a heavy-ion particle accelerator as a national large-scale research infrastructure open to national and international scientists. The Helmholtz-Association is Germany's largest research organization with more

than 33.000 employees and ad yearly budget exceeding 3.4 billion €. GSI GmbH with a work force of approx. 1100 employees and a yearly budget of over 150 M€/year is structured in two business units: the research and scientific and the administrative branch. I advise the Administrative Managing Director and interim manage the Organization and Controlling Division.

#### Key Achievements

- structuring and shaping of the Organization/Controlling Division and the Finance/Procurement Division initiating and guiding the change process for the Administration to a customer and project oriented division
- member of the task-force for Merger of GSI GmbH and FAIR GmbH
- member of the working group on the supervision of the FAIR GmbH
- interims management for the Organization/Controlling Division, coaching of the Head of the Finance and Purchasing Division, coaching of the department leader of the Patent and Technology transfer department, focusing on developing the IP-Policy
- requirements analysis for Controlling and Business Intelligence System.

#### General Responsibilities

- ensuring the process set-up for company-wide processes like budgeting, quality management, project management
- giving expertise on all FAIR related issues like in-kind contributions, project steering and control, reporting, and merging of FAIR with GSI
- giving expert advice to the CFO and the CEO of GSI

**2010 – 2011      Facility for Antiproton and Ion Research in Europe GmbH (FAIR GmbH),  
www.fair-center.org Administrative Managing Director, CFO.**

- The FAIR project represented by the FAIR GmbH is currently the largest European Research Project under construction. Its estimated cost to completion is 1.6 billion€, the envisaged start of operation is 2018.
- FAIR GmbH was founded under the umbrella of multinational treaty – The FAIR Convention. So far there are eight signatory countries to the Convention (Finland, France, Germany, India, Poland, Russia, Slovenia, and Sweden) and Spain expected to sign soon. The signatory countries are represented in the shareholders assembly through their respective nominated shareholders. For Germany the GSI GmbH is the major shareholder of FAIR. Shareholders contribute to the facility either in cash or in-kind. The FAIR accelerator facility complex will provide to more than 3000 scientists high precision heavy ion and antiproton beams at various experimental stations.

#### Key Achievements

- bringing the company into operation



- shaping the companies organization, structure and major processes
- shaping and setting up the administration business unit including the site & buildings division
- major contracts – site & buildings, business management contract with GSI GmbH, in kind contracts

#### General responsibilities

- full personal liability for the company's assets
- reporting to the shareholders assembly
- liaisons to shareholders, ministries and other stakeholders of FAIR
- liaisons to local authorities and the public bringing up a fully-fledged research facility – construction budget 1.6 billion€, expected yearly budget for operations 150 million€ joint management with the scientific managing director of the company yearly cash budget ramping up from 2 million€ (shortened financial year Oct.2010 – Dec. 2012) up to 44 million€ in 2012
- Personnel ramping up from 2 employees in Oct 2010 up to 35 in 2011
- set-up of the company
- Finances, accounting, purchasing, legal services
- all issues related to site & buildings, building permits, etc.
- general services
- personnel and recruitment
- technical safety and security

**2001 – 2010**      **GSI Helmholtzzentrum für Schwerionenforschung GmbH; [www.gsi.de](http://www.gsi.de)**

**2009 – 2010**      **Designated Administrative Director for FAIR, FAIR Division, Prokura (proxy holder on behalf of GSI GmbH)**

Within the GSI GmbH as designated major shareholder, host lab and providing the injector accelerators to the FAIR facility, the FAIR division has been established providing the seed for the company to be founded. I took over the responsibility to coordinate and account for all necessary work and preparations to start-up the company FAIR GmbH after the signature of the Convention for FAIR.

#### Key Achievements

- providing advice to the international community (in this respect the representatives to the prospective signatory countries – mostly research ministries or research organizations) to formulate the legal documents
- formulating the contractual framework for in-kind contributions
- preparing the SAP-ERP system of GSI to accommodate FAIR's accounting area independently
- pre-defining structures and processes for the FAIR GmbH

#### General Responsibilities

- proxy holder for GSI GmbH for all FAIR issues
- recruiting in advance for the FAIR GmbH

#### 2006 – 2009      **Deputy Division leader FAIR Technical Division, Deputy Technical Project Leader Accelerator and Site & Buildings, Principal Investigator**

Focusing on the technical challenges of the FAIR project (accelerator construction and issues concerning site & buildings), I was Deputy for the assigned Technical Director for FAIR. The GSI's FAIR Division was holding five departments and almost 100 employees. The main focus of the Division laid on elaborating all specifications for the accelerator complex and the construction and development of site & buildings.

#### Key achievements

- implementing project structures for the accelerator sub-project
- recruiting key personnel for the newly formed site & buildings department
- implementing the central documentation and document management system for FAIR
- structuring of the project and the project documentation

#### General Responsibilities

- assuring the completeness and integrity of the specifications
- managing the accelerator subproject within the EU-FP7 preparatory
- phase program for FAIR □ principal investigator within the Helmholtz
- Program "Structure of Matter" □ managing the division on behalf of the division leader
- budgeting for the division

#### 2001 – 2006      **Researcher Accelerator Division, Injectors Department**

GSI runs a large scale accelerator on a 7/24 basis for approx. 6000 hours/year. Within the linear accelerator and injector group I was the responsible liaison person to the controls department

#### Key achievements

- redesign and supervision of the implementation of the experimental beam line for the Super Heavy Elements (SHE) Program@GSI (discovery of new elements) and bringing it into successful operation
- requirements specification of the FAIR control system and machine protection systems

#### General responsibilities

- responsible machine physicist on duty for the linear accelerator
- accelerator coordinator on duty



- beam-line responsible for the SHE-beamline and general beam diagnostics
- requirements analysis and specifications for operating software and beam diagnostics elements  
Work package leader EU FP6 Program GANMVL
- supervisor for summer students

**1996 – 2001      Researcher, Institute for Nuclear Physics, Technical University Darmstadt**

I worked on my PhD thesis on the “*Design and Implementation of a Local Control System for the S-DALINAC*”. This involved the designing of hardware boards, and involved me writing approximately 15.000 lines of code. The work comprised the completely new set-up of the local control system, but still to work together with the remote controls. I was also involved in the supervision of students at the University.

**Key achievements**

- implementing a new local controls system for the accelerator
- implementing a new rf-controls system (supervision of a diploma thesis)
- implementing a controls system for the Helium refrigerator (supervision of a diploma thesis)
- implementing an archiving database for accelerator settings

**General responsibilities**

- ensuring the operationally of the accelerator
- deputy IT-Manager of the institute
- supervision of diploma/master thesis
- co-supervision of PhD thesis
- supervision of the practical training of graduate students (lab work)

**EXHIBIT F**

## **Expert Report of Robert D. Young Analysis of MaverikMonitor Logging Client V1.5.1**

**Robert D. Young**

November 21, 2017

Ability Systems Corporation

PO Box 6593

Aloha, OR 97007

Tel: (503) 259-2614

Fax: (503) 802-9711

Robert@AbilitySys.com

### **Introduction and Summary of Opinions**

1. My name is Robert D. Young. I have been engaged by RightsEnforcement ([www.rightsenforcement.com](http://www.rightsenforcement.com)) to review the source code for the MaverikMonitor Logging Client V1.5.1 software (“MaverikMonitor”) and ascertain how the program operates, and what information the program captures and records. The MaverikMonitor program was designed to track, and collect electronic evidence about IP Addresses<sup>1</sup> that use the BitTorrent protocol to distribute files over the Internet. The purpose of my review was to verify that the MaverikMonitor program records evidence of BitTorrent transactions between IP Addresses and the MaverikMonitor program.

2. I am the President of the Ability Systems Corporation (“Ability”), an Oregon company founded in 1990 that specializes in the preservation and analysis of computer-related evidence. Ability also provides consulting services to computer hardware and software manufacturers and computer-related technical assistance to the legal profession. I have provided trial testimony, deposition testimony and have been admitted as an expert in numerous State, Federal and Municipal courts, details of which are provided in Exhibit 1 of this report.

3. I have been compensated for my work on this report at the rate of \$250 per hour.

4. If called upon, I can and will testify at trial as to the specific details of this report. I may also provide a tutorial that explains the technology at issue, which may include the use of a multimedia presentation that I will create to explain the relevant technology.

---

<sup>1</sup> This report uses the term “IP Address” to identify peers within a BitTorrent swarm that are using a device to communicate through an IP Address.

### **Summary of Opinions**

5. Based upon my review of the MaverikMonitor source code, I conclude that the MaverikMonitor software locates and establishes a TCP/IP connection with IP Addresses that are using the BitTorrent protocol to distribute copies of specifically identified materials.

6. The MaverikMonitor software records its transactions with each IP Address it identifies. The MaverikMonitor software also downloads multiple “pieces” of the identified material in order to confirm that the materials are what they report themselves to be. The download also confirms that the materials are accessible and in fact being distributed by the identified IP Address.

### **Basis for Opinions**

7. All of the facts and data upon which I base my opinions, conclusions, and inferences are of a type reasonably relied upon by experts in my particular field in forming opinions, conclusions, or inferences upon the subject matter of this report.

### **BitTorrent File Sharing Basics**

8. BitTorrent is a “protocol” (a pre-defined method or technique) for distributing files over the Internet. One of the advantages of the BitTorrent protocol over other file distribution techniques is that the work of sending files is distributed to multiple computers by dividing the material to be sent into multiple smaller pieces and allowing any of the computers that already have one of the pieces to fulfill a request for that piece. This “division of labor” feature prevents one single computer from becoming a bottleneck, and has been shown to greatly reduce the time needed to distribute a large amount of content.

9. The material to be distributed using the BitTorrent protocol is referred to as a “torrent,” which can consist of one file or multiple files. The contents of a given torrent are divided

into multiple smaller pieces and those pieces are described in a “.torrent” (pronounced “dot-torrent”) file.

10. Each .torrent file includes the name and size of each piece of the associated torrent, and also includes the information needed to locate each piece so the computer receiving the torrent can find each piece and download it to obtain a copy.

11. The .torrent file also includes a “hash” value for each piece. The hash value is a large number calculated from the content of each piece, using a formula called the “Secure Hash Algorithm 1” (or “SHA1”). The SHA1 calculation is designed to ensure that when each piece is downloaded to a new computer, the receiving computer can perform the same SHA1 calculation and compare the new value to the hash value listed in the .torrent file and ensure the received piece is identical to the one it requested.

12. To start the distribution process, the .torrent file is made available to other computers, typically by posting it on a web server where it can be obtained by anyone wishing to receive a copy of the torrent. Using software specifically designed to handle the BitTorrent protocol, the receiving computers process the .torrent file and begin receiving pieces. BitTorrent-compatible software is freely available on the Internet, in both paid and no-cost, open source versions.

13. As each piece of a torrent is successfully received by an IP Address, that IP Address immediately announces that it also has that new piece available so other IP Addresses seeking a copy of the same torrent can add the new location to their list of sources.

14. A complete copy of the most recent official specification for the BitTorrent protocol is attached to this report as Exhibit 2.



### **What MaverikMonitor Does**

15. The MaverikMonitor program is part of a system used to locate and connect with IP Addresses that are participating in the distribution of specific materials via the BitTorrent network. The MaverikMonitor program records the transactions with those IP Addresses, and produces reports based on the transactions.

16. The MaverikMonitor program is written to run on multiple computers simultaneously (referred to as MaverikMonitor “clients”), each client reading and processing a set of pre-selected .torrent files. It is my understanding that these .torrent files are specifically selected because the materials in their associated torrents are unauthorized copies of work protected by United States copyright laws.<sup>2</sup> It is also my understanding that procedures are used to locate, confirm and preserve the contents of each torrent when a .torrent file is used with MaverikMonitor, and these procedures also accommodate situations where the status of a torrent changes (such as when it is no longer necessary to locate IP Addresses distributing that specific material).

17. The source code shows that each of the MaverikMonitor client computers processes the .torrent files assigned to it, and announces to other IP Addresses in the BitTorrent network that they too are participating in the sharing of the associated torrents. However, the source code was written in such a way that MaverikMonitor does not actually distribute/upload any of the associated torrents. MaverikMonitor then identifies the other IP Addresses participating in the sharing of the same torrent by: (i) seeking other IP Addresses that have also announced they are distributing the same torrent; and (ii) accepting requests from other computers attempting to obtain pieces of the given torrent from a MaverikMonitor client computer.

---

<sup>2</sup> Per telephone discussion with Ben Perino on June 15th, 2017.

18. Once a participating IP Address is located, MaverikMonitor establishes a TCP/IP connection to that IP Address. During the connection, the contents of each transmission from the IP Address is recorded by MaverikMonitor. As part of the initial exchange, MaverikMonitor records information about that transaction, such as the date and time of the TCP/IP connection, the IP Address used, the name of the BitTorrent Client used by the IP Address, the “port” number (essentially, as sub-address used to route data) used by the IP Address, and the “peer ID” reported by the BitTorrent software.

19. Since MaverickMonitor initiates the connection with an IP address, that IP address must be an accurate IP address used by the infringer because otherwise a connection could not have been made. Once the connection has been established, the interaction of the MaverickMonitor software with the IP Address ensures that the IP address identification was not “spoofed or a false positive.

20. It is my understanding that the clocks on each MaverikMonitor client computer as well as the clocks on the database servers used to record data are synchronized to an internationally accepted time source using the Network Time Protocol (“NTP”) to ensure the recorded times are accurate, and each synchronization is logged. These steps ensure that the information recorded can be subsequently used by an Internet Service Provider to accurately determine which of their subscribers was using a given IP address at the recorded time.

21. After the initial handshake, MaverikMonitor downloads pieces of the selected torrent from the IP Address, and verifies that they are correct by calculating and recording the hash value for each piece. This download process is completed before the connection with the IP Address is closed to ensure the handshake and torrent data accurately reflect the IP Address responsible for the collected material.

**Information Considered In Forming Opinions Materials Received and Considered**

22. In addition to any materials cited directly, the following materials were received and considered during the preparation of this report:

<b><u>ID</u></b>	<b><u>Description</u></b>
AMT001	MaverikMonitor Logging Client - PCAP

DATED: November 21, 2017

  
\_\_\_\_\_  
Robert D. Young, President  
Ability Systems Corporation

---

# **Curriculum Vitae, Qualifications, Testimony**

**Robert D. Young**

Ability Systems Corporation  
PO Box 6593  
Aloha OR 97007  
Tel: (503) 259-2614  
FAX: (503) 802-9711  
Robert@AbilitySys.com

## Qualifications

---

### Education and Experience

Robert D. Young received a Bachelors degree in Computer Science (BSCS) from Portland State University in 1984. He received a Masters degree in Business Administration (MBA) with Honors from Portland State University in 1991.

Mr. Young has over 36 years' experience in the computer industry and has held positions as varied as computer operator, applications programmer, systems analyst, systems programmer, technical support specialist and network manager. He has worked with a wide range of computers including mainframe computer systems, mini-computer systems and microcomputers (PCs) and programmable device (such as "smart" phones), along with the networks that connect them. Among his accomplishments are the designing and implementing of secure network connections between government agencies in the Portland, Oregon area, the design and installation of both PC networks and mainframe systems for the nationwide cold-storage firm Americold, and the design, implementation and management of a company wide auditor-support computer network for US Bancorp.

In 1986, Mr. Young helped start the Portland Area Network Users Group, a forum for users of PC networking software. He also assisted in the formation of the international Novell user organization. His responsibility included serving on the board of the Portland user group chapter representing them at international meetings, and has been awarded a lifetime membership in recognition of his efforts.

Since 1988, Mr. Young has received formal training in software and computer forensics, including the validity and infringement analysis of patents, trade secret evaluation and source code copyright analysis under the auspices of Johnson-Laird, Inc... For the past 24 years he has worked as a forensic software analyst, specializing in the preservation, production and analysis of computer-based evidence. Since 1990, Mr. Young has been the president of the Ability Systems Corporation, an Oregon corporation that provides computer forensic services.

Mr. Young specialties include software methodology and claim analysis for patent infringement, Cyber-Forensics® (performing plagiarism assessment of computer software for purposes of assessing copyright infringement) and performing authorship analysis for misappropriation of trade secrets. Mr. Young has extensive experience in the administration and analysis of software "clean room" environments, including work for a large software company developing competitive products. Mr. Young also specializes in Techno-Archeology®, the analysis of failed software development projects (projects that fail to meet contractual requirements or that are terminated for cause prior to completion), multimedia and digital video analysis, and computer-based evidence preservation, recovery, and analysis.

---

## Publications And Papers Presented

### Publications

*"Login Scripts"* PortLAN Newsletter (ISSN 1044-0739), February, 1993

*"BrainShare '93"* PortLAN Newsletter, May, 1993

*"Btrieve Tales of Woe"* PortLAN Newsletter, October, 1993

### Papers Presented

*"Forensic Computer Analysis and what it means to Network Administrators,"* Bellingham Computer Management Group, Bellingham, Washington, October 1998

*"Maintaining the confidentiality of your computer-based records,"* Bullard, Korshoj, Smith & Jernstedt client briefing, Portland, Oregon, October 1999

*"Computer Based Evidence, or 'What's so bad about paper?'"* Lane, Powell, Spears & Lubersky, Portland, Oregon, November 1999 (CLE).

*"Information Technology Basics,"* The Computer Law Association Cyberspace Camp, San Jose, California, March 2000.

*"The camera (and computer) cannot lie. But they can be an accessory to untruth,"* Oregon Criminal Defense Lawyers Association Annual Conference, Bend, Oregon, June 2000.

*"Data Security: Practical Tips For Effective Security And Privacy Policies,"* Law Seminars International Doing Business On Line Conference, Seattle, Washington, October 2000

*"Three Phases of Forensic Evidence Analysis,"* 2001 Federal Public Defenders Computer Systems Administrator Conference, San Diego, California, June 2001

*"Computer Forensics: What You Should Know About What the Cops Know,"* Oregon Criminal Defense Lawyers Association Seminar, Portland, Oregon, February 2004

*"Computer Evidence Analysis: How evidence is found and what it can mean,"* Boston Federal Public Defenders, Boston, Massachusetts, March, 2006

*"Computer Forensics for Defense Counsel,"* CJA Panel Attorney Training, Baltimore, Maryland, May, 2006

*"Computer Evidence,"* Federal Public Defenders of Utah, Salt Lake City, Utah. January 2012



---

## Expert Testimony

Since 1988, Mr. Young has performed patent, trade secret and copyright analysis as well as computer forensic analysis on several matters that did not (or have not yet) required testimony. These include preliminary work in anticipation of filing a lawsuit, and analysis work done to ensure a company is prepared to defend itself against an anticipated lawsuit. The following cases are matters for which Mr. Young's work has been disclosed:

## Trial Testimony

1. Circuit Court of Oregon, Multnomah County, *State of Oregon vs. Barney Jean*, Case 99-06-34279, September 1999
2. Circuit Court of Oregon, Multnomah County, *State of Oregon vs. Christopher Hopkins Ediger*, Case 00-03-32855, October 2000
3. Testified regarding computer evidence before Grand Jury of Philadelphia, November 2000
4. Superior Court of California, San Diego County, *Information Management Group International, Inc. vs. Telecom Solutions et al.*, Case 721937, December 2000
5. United States District Court for the State of Utah, Central Division, *United States of America vs. Jeffery Tucker*, 98 CR 425C, January 2001
6. Court of Common Pleas of Philadelphia County, Pennsylvania, Family Court Division, Domestic Relations Branch, *Stuart A. Neill vs. Heather A. Dials Neill*, D.R. No OC0100078, May/June 2001
7. United States District Court for the Southern District of Florida, *United States of America vs. Herbert Pierre-Louis*, 00-434-CR-GOLD, September 2001
8. United States District Court, Western District of Missouri, Western Division, *Pioneer Financial Services, Inc. vs. Omni Financial Corporation*, No. 99-1212-CV-W-2, September 2001
9. United States District Court, Northern District of California, *Asian Communications Pty Ltd., et al., vs. Zi Corporation*, Case C-00-0989 PJH, August 2002
10. Circuit Court of Oregon, Multnomah County, *State of Oregon vs. Harry Robert Ketchum III*, Case 02-02-31097, October 2002
11. United States District Court, Southern District of Alabama, *United States of America vs. Avraham Yeshurom Kaiser*, Case MJ02-0097-M, November 2002
12. District Court of Tarrant County, Texas, 67<sup>th</sup> Judicial District, *American Airlines, Inc. vs. FareChase, Inc.*, Case 067-194022-02, February 2003
13. District Court of Dakota County, Minnesota, *State of Minnesota vs. Brian Victor Myrland*, Case C8-01-2223, April 2003
14. United States District Court, District of Oregon, *United States of America vs. Robert Ian Greathouse*, Case CR02-476-KI, September 2003

15. District Court of El Paso County, Colorado, *State of Colorado vs. Sanford B. Schupper*, Cases 96CR1193, 01CR2859 and 01CR2889, September 2003
16. United States District Court, District of Oregon, *United States of America vs. James M. McLennan*, Case CR02-477-HA, October 2003
17. United States District Court, District of Utah, *United States of America vs. David Benjamin Mosier aka Scott Calvin*, Case 1:03CR00145TS, March 2004
18. District Court of El Paso County, Colorado, *State of Colorado vs. Jodi LeBlanc*, Case 202CR4437, March 2004
19. United States District Court, Western District of Washington at Tacoma, *United States of America vs. Robert Charles Lee*, Case 03-5120M, September 2004
20. United States District Court, Central District of California, *United Autocomp Computer, Inc. vs. Global Credit Services, Inc.*, Case SA CV 02-413 DOC (ANx), October 2004 (Neutral)
21. United States District Court, Western District of Pennsylvania, *Viad Corp. vs. C. Alan Cordial, Clifford E. Hellberg and Calan Communications*, Civil Action No. 03-1408, October 2004
22. Circuit Court of Oregon, Multnomah County, *Lisa Benitez vs. Neil Mages*, Case 04-09-69955, December 2004
23. Circuit Court of Oregon, Clatsop County, *State of Oregon vs. Andrew William Betnar*, Case 03-1274, January 2005
24. District Court of Salt Lake County, Utah, *State of Utah vs. Justin Blaine Davila*, Case 031902950FS, March 2005
25. United States District Court, District of Oregon, *United States of America vs. James M. McLennan*, Case CR02-477-HA, April 2005
26. Circuit Court of Oregon, Clackamas County, *State of Oregon vs. Gregg Bryant Ritchie*, Case 04-11509, June 2005
27. United States District Court, District of Oregon, *United States of America vs. Andrew ilcauskas and Robert Bloodgood*, Case CR04-423-HA, January 2006
28. United States District Court, District of Oregon, *United States of America vs. Timothy Olander*, Case CR06-75-HA, September 2006
29. United States District Court, District of Oregon, *United States of America vs. William Brook Knowles*, Case CR07-742JKB, August 2007
30. Superior Court of New Hampshire, Belknap County, *New Hampshire Ball Bearings, Inc., vs W. Scott Jackson, Sargent Controls And Aerospace, and Does 1-10*, Case 06-E-0106, November 2007
31. Circuit Court of Oregon, Lane County, *State of Oregon vs. Barry Barger*, Case 20-08-01740, February 2008

32. United States District Court, Western District of Texas, El Paso Division, *United States of America vs. Arkon Christopher Caldwell*, Case EP:07-CR-01512, March 2008
33. United States District Court, Western District of Washington, *United States of America vs. Kenneth Gouin*, Case CR 05-433 RSL, March 2008
34. Circuit Court of Oregon, Lane County, *State of Oregon vs. Barry Barger*, Case 20-08-01740, March 2008
35. Circuit Court of Oregon, Josephine County, *State of Oregon vs. Carvel Gordon Dillard*, Case 06-CR-0615, May 2008
36. United States District Court, District of Oregon, *United States of America vs. Charles E. Tarbell*, Case CR08-23-KI, June 2009
37. United States District Court, Western District of Washington, *United States of America vs. Joshua Osmun Kennedy*, Case CR08-354RAJ, August 2009
38. Montana Fourth Judicial District Court, Missoula County, *State of Montana vs. Alexander Hovey*, Case DC-08-456, November 2009
39. United States District Court, District of Oregon, *United States of America vs. John Henry Ahrndt*, Case 08-CR-468-KI, January 2010
40. United States District Court, District of Oregon, *United States of America vs. Terrance S. Carpenter*, Case 08-000049-001, February 2010
41. United States District Court for the Western District of Texas, Austin Division, *Myriad Development, Inc. vs. Alltech, Inc.*, Case No. A-08-CV-253-55, March 2010
42. Circuit Court of Oregon, County of Klamath, *Matter of Taarna Finly, Korben Finley and River Finley*, Case 0900299JV1-3, November 2010
43. Superior Court of Washington, County of Clark, *State of Washington vs. Trevor Thomas Hutchinson-Flaming*, Case 10-1-00-918-3, February 2011
44. Utah Sixth Judicial District Court, Sevier County, *State of Utah vs. Donald Mitchell*, Case No. 071600174FS, April, 2011
45. General Court Martial, United States Army, Fourth Judicial Circuit, Joint Base Lewis McChord, *United States v. PFC Ronald Washington*, June 2011
46. Superior Court of California, Santa Cruz County, *State of California v. Richard Nelson Nash*, Case FI8291, October 2011

47. United States District Court For The Western District Of North Carolina, Charlotte Division, Bridgetree, Inc. and Two Bit Dog, LLC vs. Red F Marketing LLC, Target Point, LLC, Daniel Roselli, Teng Li, Jason Li, Mali Xu, Mark Epperly and Elton T. Scripter, Case Number 3:10-CV-228, February 2012
48. Circuit Court of Oregon, County of Marion, Mark Long v. John Kroger in his official capacity as Attorney General for the State of Oregon, Case 11C14422, March 2012
49. Superior Court of California, Santa Cruz County, State of California v. James Edward Taylor, Case (unknown), May 2012
50. United States District Court for the Eastern District of North Carolina, Western Division, Silicon Knights, Inc. vs. Epic Games, Inc., Civil Action No. 5-07-CV-00275-D, May 2012
51. United States District Court For The Western District Of North Carolina, Charlotte Division, Bridgetree, Inc. and Two Bit Dog, LLC vs. Red F Marketing LLC, Target Point, LLC, Daniel Roselli, Teng Li, Jason Li, Mali Xu, Mark Epperly and Elton T. Scripter, Case Number 3:10-CV-228, August 2012
52. United States District Court for the State of Utah, Central Division, United States of America vs. Michael L. Dunn, 2:09-cr-00895-DB-1, October 2012
53. United States District Court, District of Oregon, United States of America vs. John Henry Ahrndt, Case 08-CR-468-KI, November 2012
54. United States District Court for the State of Utah, Central Division, United States of America vs. Michael L. Dunn, 2:09-cr-00895-DB-1, January 2013
55. Superior Court of California, County of Contra Costa, Martinez, State of California v. Joseph Charles Farrugia, No. 161673-9, February 2014
56. Superior Court of California, County of Santa Cruz, State of California v. Matthew James Graham, No. F25062, August 2014
57. Superior Court of California, County of Santa Clara, State of California v. Dan Weaver, No. C1480073, March 2016
58. United States District Court, District of Oregon, Portland Division, Peggy Foraker v. USAA Casualty Insurance Company, No. 3:14-cv-00087-BR. May 2016
59. Superior Court of California, County of Santa Clara, State of California v. Dan Nguyen, No. C1520638, July 2017

## Deposition Testimony

1. District Court of Travis County, Texas, 200<sup>th</sup> Judicial District, BMC Software, Inc. vs. Peregrine Systems, Inc et al., Case 95-10161

2. Circuit Court of Oregon, Multnomah County, Allstate Insurance Company vs. First Healthcare et al., Case 9907-07260
3. United States District Court for the Southern District of California, WebSideStory, Inc. vs. WebTrends Corporation, Case 99CV2498 BTM (RBB)
4. Superior Court of California, San Diego County, Information Management Group International, Inc. vs. Telecom Solutions et al., Case 721937
5. United States District Court for the Eastern District of Virginia (Alexandria Division), Dr. Bradley S. Fordham vs. OneSoft Corporation et al., Case 00-1078-A
6. United States District Court, Western District of Missouri, Western Division, Pioneer Financial Services, Inc. vs. Omni Financial Corporation, No. 99-1212-CV-W-2
7. United States District Court, Northern District of California, Asian Communications Pty Ltd., et al., vs. Zi Corporation, Case C-00-0989 PJH
8. United States District Court, District of Connecticut, Narain C. Scott, et als. vs. Aetna Services, Inc., Case 3:01 CV 0046 (CFD)
9. District Court of Travis County, Texas, 126<sup>th</sup> Judicial District, Recruitsoft, Inc. and Recruitsoft (Canada) Corporation, Inc. v. Claude Girard and Hire.com, Inc., Case GN-301147, August 2003
10. United States District Court, Southern District of New York, Lamda Data Systems and P&C Insurance Systems, Inc. vs. Policy Administration Solutions, Inc. and Peter Pantelides, Case No. 02 CV 8693 (RCC)(THK), October 2003
11. United States District Court, District of Massachusetts, Knowledge Mechanics, Inc. vs. Outstart, Inc., John Alonzo and Michelle Bruce, Civil Action 01-11178-GAO, November 2003
12. United States District Court, District of Arizona, Phoenix Division, Lexcel Solutions, Inc. vs. MasterCard International Incorporated and MasterCard International, LLC, Civil Action No. CV 03-1454PHX-JAT, August 2004
13. United States District Court, Western District of Pennsylvania, Viad Corp. vs. C. Alan Cordial, Clifford E. Hellberg and Calan Communications, Civil Action No. 03-1408, October 2004
14. United States District Court, Western District of Pennsylvania, Medrad, Inc. vs. Tyco Healthcare Group LP, Mallinckrodt Inc., Liebel-Flarsheim Co. and Nemoto Kyorindo Co., Ltd., Civil Action No. 01-1997, June 2005
15. United States District Court, District of Delaware, Affinion Loyalty Group, Inc. v. Maritz, Inc., Civil Action No. 04-360-JJF, June 2006
16. United States District Court, Southern District of Ohio, Western Division, Market Scan Information Systems, In. vs. The Reynolds and Reynolds Company, Inc. et al., Case No. 3-06-CV-0254, November 2006

17. Superior Court of New Hampshire, Belknap County, *New Hampshire Ball Bearings, Inc., vs W. Scott Jackson, Sargent Controls And Aerospace, and Does 1-10*, Case 06-E-0106, January 2007
18. United States District Court, Southern District of Ohio, Western Division, *Market Scan Information Systems, In. vs. The Reynolds and Reynolds Company, Inc. et al.*, Case No. 3-06-CV-0254, February 2007
19. Superior Court of New Hampshire, Belknap County, *New Hampshire Ball Bearings, Inc., vs W. Scott Jackson, Sargent Controls And Aerospace, and Does 1-10*, Case 06-E-0106, October 2007
20. United States District Court, District of Oregon, *Alternative Legal Solutions. Inc. dba Compli vs. Ferman Management Services Corp., Mosaic Interactive LLC and Stephen B Straske II*, Case No. CV07-880-ST, November 2008
21. United States District Court for the Western District of Texas, Austin Division, *Myriad Development, Inc. vs. Alltech, Inc.*, Case No. A-08-CV-253-55, July 2009
22. United States District Court for the Northern District of Texas, Dallas Division, *Gillani Consulting, Inc. vs. Ferguson Enterprises, Inc.*, Civil Action No. 3-07CV1488-0, March 2010
23. United States District Court for the Eastern District of North Carolina, Western Division, *Silicon Knights, Inc. vs. Epic Games, Inc.*, Civil Action No. 5-07-CV-00275-D, May 2010
24. Superior Court Of The State Of California, County Of Santa Clara, *Monolithic Power Systems, Inc. vs. Wei Chen*, Case No.110-cv-172961, November 2011
25. United States District Court For The Western District Of North Carolina, Charlotte Division, *Bridgetree, Inc. and Two Bit Dog, LLC vs. Red F Marketing LLC, Target Point, LLC, Daniel Roselli, Teng Li, Jason Li, Mali Xu, Mark Epperly and Elton T. Scripter*, Case Number 3:10-CV-228, January 2012
26. United States District Court, Central District of California, *SMC Networks Inc. vs. Hitron Technologies Inc., et al.*, Case Number SACV 12-1293-JLS (RNBx), September 2013
27. United States District Court, Central District of California, *Meggitt (San Juan Capistrano), Inc. vs. Nie Yongzhong and Xiamen Niell Electronics Co. Ltd.*, Case Number SACV13-00239 DOC (MLGx), March 2015



## BitTorrent.org

[Home](#) [For Users](#) [For Developers](#) [Developer mailing list](#) [Forums \(archive\)](#)

**BEP:** 3

**Title:** The BitTorrent Protocol Specification

**Version:** 0e08ddf84d8d3bf101cdf897fc312f2774588c9e

**Last-Modified:** Sat Feb 4 12:58:40 2017 +0100

**Author:** Bram Cohen <bram@bittorrent.com>

**Status:** Final

**Type:** Standard

**Created:** 10-Jan-2008

**Post-History:** 24-Jun-2009 (arvid@bittorrent.com), clarified the encoding of strings in torrent files. 20-Oct-2012 (arvid@bittorrent.com), clarified that info-hash is the digest of en bencoding found in .torrent file. Introduced some references to new BEPs and cleaned up formatting. 11-Oct-2013 (arvid@bittorrent.com), correct the accepted and de-facto sizes for request messages 04-Feb-2017 (the8472.bep@infinite-source.de), further info-hash clarifications, added resources for new implementors

BitTorrent is a protocol for distributing files. It identifies content by URL and is designed to integrate seamlessly with the web. Its advantage over plain HTTP is that when multiple downloads of the same file happen concurrently, the downloaders upload to each other, making it possible for the file source to support very large numbers of downloaders with only a modest increase in its load.

### A BitTorrent file distribution consists of these entities:

- An ordinary web server
- A static 'metainfo' file
- A BitTorrent tracker
- An 'original' downloader
- The end user web browsers
- The end user downloaders

There are ideally many end users for a single file.

### To start serving, a host goes through the following steps:

1. Start running a tracker (or, more likely, have one running already).
2. Start running an ordinary web server, such as apache, or have one already.

3. Associate the extension `.torrent` with mimetype `application/x-bittorrent` on their web server (or have done so already).
4. Generate a metainfo (`.torrent`) file using the complete file to be served and the URL of the tracker.
5. Put the metainfo file on the web server.
6. Link to the metainfo (`.torrent`) file from some other web page.
7. Start a downloader which already has the complete file (the 'origin').

### To start downloading, a user does the following:

1. Install BitTorrent (or have done so already).
2. Surf the web.
3. Click on a link to a `.torrent` file.
4. Select where to save the file locally, or select a partial download to resume.
5. Wait for download to complete.
6. Tell downloader to exit (it keeps uploading until this happens).

### bencoding

- Strings are length-prefixed base ten followed by a colon and the string. For example `4:spam` corresponds to 'spam'.
- Integers are represented by an 'i' followed by the number in base 10 followed by an 'e'. For example `i3e` corresponds to 3 and `i-3e` corresponds to -3. Integers have no size limitation. `i-0e` is invalid. All encodings with a leading zero, such as `i03e`, are invalid, other than `i0e`, which of course corresponds to 0.
- Lists are encoded as an 'l' followed by their elements (also bencoded) followed by an 'e'. For example `l4:spam4:eggse` corresponds to ['spam', 'eggs'].
- Dictionaries are encoded as a 'd' followed by a list of alternating keys and their corresponding values followed by an 'e'. For example, `d3:cow3:moo4:spam4:eggse` corresponds to {'cow': 'moo', 'spam': 'eggs'} and `d4:spam11:a1:bee` corresponds to {'spam': ['a', 'b']}. Keys must be strings and appear in sorted order (sorted as raw strings, not alphanumerics).

### metainfo files

Metainfo files (also known as `.torrent` files) are bencoded dictionaries with the following keys:

#### announce

The URL of the tracker.

#### info

This maps to a dictionary, with keys described below.

All strings in a `.torrent` file that contains text must be UTF-8 encoded.

#### info dictionary

The `name` key maps to a UTF-8 encoded string which is the suggested name to save the file (or directory) as. It is purely advisory.

`piece length` maps to the number of bytes in each piece the file is split into. For the purposes of transfer, files are split into fixed-size pieces which are all the same length except for possibly the last one which may be truncated.

`piece length` is almost always a power of two, most commonly  $2^{18} = 256 \text{ K}$  (BitTorrent prior to version 3.2 uses  $2^{20} = 1 \text{ M}$  as default).

`pieces` maps to a string whose length is a multiple of 20. It is to be subdivided into strings of length 20, each of which is the SHA1 hash of the piece at the corresponding index.

There is also a key `length` or a key `files`, but not both or neither. If `length` is present then the download represents a single file, otherwise it represents a set of files which go in a directory structure.

In the single file case, `length` maps to the length of the file in bytes.

For the purposes of the other keys, the multi-file case is treated as only having a single file by concatenating the files in the order they appear in the files list. The files list is the value `files` maps to, and is a list of dictionaries containing the following keys:

`length` - The length of the file, in bytes.

`path` - A list of UTF-8 encoded strings corresponding to subdirectory names, the last of which is the actual file name (a zero length list is an error case).

In the single file case, the name key is the name of a file, in the multiple file case, it's the name of a directory.

## trackers

Tracker GET requests have the following keys:

`info_hash`

The 20 byte sha1 hash of the bencoded form of the info value from the metainfo file. This value will almost certainly have to be escaped.

Note that this is a substring of the metainfo file. The info-hash must be the hash of the encoded form as found in the .torrent file, which is identical to bdecoding the metainfo file, extracting the info dictionary and encoding it *if and only if* the bdecoder fully validated the input (e.g. key ordering, absence of leading zeros). Conversely that means clients must either reject invalid metainfo files or extract the substring directly. They must not perform a decode-encode roundtrip on invalid data.

`peer_id`

A string of length 20 which this downloader uses as its id. Each downloader generates its own id at random at the start of a new download. This value will also almost certainly have to be escaped.

`ip`

An optional parameter giving the IP (or dns name) which this peer is at. Generally used for the origin if it's on the same machine as the tracker.

`port`

The port number this peer is listening on. Common behavior is for a downloader to try to listen on port 6881 and if that port is taken try 6882, then 6883, etc. and give up after 6889.

`uploaded`

The total amount uploaded so far, encoded in base ten ascii.

`downloaded`

The total amount downloaded so far, encoded in base ten ascii.

left

The number of bytes this peer still has to download, encoded in base ten ascii. Note that this can't be computed from downloaded and the file length since it might be a resume, and there's a chance that some of the downloaded data failed an integrity check and had to be re-downloaded.

event

This is an optional key which maps to `started`, `completed`, or `stopped` (or empty, which is the same as not being present). If not present, this is one of the announcements done at regular intervals. An announcement using `started` is sent when a download first begins, and one using `completed` is sent when the download is complete. No `completed` is sent if the file was complete when started. Downloaders send an announcement using `stopped` when they cease downloading.

Tracker responses are bencoded dictionaries. If a tracker response has a key `failure reason`, then that maps to a human readable string which explains why the query failed, and no other keys are required. Otherwise, it must have two keys: `interval`, which maps to the number of seconds the downloader should wait between regular rerequests, and `peers`. `peers` maps to a list of dictionaries corresponding to `peers`, each of which contains the keys `peer id`, `ip`, and `port`, which map to the peer's self-selected ID, IP address or dns name as a string, and port number, respectively. Note that downloaders may rerequest on nonscheduled times if an event happens or they need more peers.

More commonly is that trackers return a compact representation of the peer list, see [BEP 23](#).

If you want to make any extensions to metainfo files or tracker queries, please coordinate with Bram Cohen to make sure that all extensions are done compatibly.

It is common to announce over a [UDP tracker protocol](#) as well.

## peer protocol

BitTorrent's peer protocol operates over TCP or [uTP](#).

Peer connections are symmetrical. Messages sent in both directions look the same, and data can flow in either direction.

The peer protocol refers to pieces of the file by index as described in the metainfo file, starting at zero. When a peer finishes downloading a piece and checks that the hash matches, it announces that it has that piece to all of its peers.

Connections contain two bits of state on either end: choked or not, and interested or not. Choking is a notification that no data will be sent until unchoking happens. The reasoning and common techniques behind choking are explained later in this document.

Data transfer takes place whenever one side is interested and the other side is not choking. Interest state must be kept up to date at all times - whenever a downloader doesn't have something they currently would ask a peer for in unchoked, they must express lack of interest, despite being choked. Implementing this properly is tricky, but makes it possible for downloaders to know which peers will start downloading immediately if unchoked.

Connections start out choked and not interested.

When data is being transferred, downloaders should keep several piece requests queued up at once in order to get good TCP performance (this is called 'pipelining'.) On the other side, requests which can't be written out to the TCP buffer immediately should be queued up in memory rather than kept in an application-level network buffer, so they can all be thrown out when a choke happens.

The peer wire protocol consists of a handshake followed by a never-ending stream of length-prefixed messages. The handshake starts with character nineteen (decimal) followed by the string 'BitTorrent protocol'. The leading character is a length prefix, put there in the hope that other new protocols may do the same and thus be trivially distinguishable from each other.

All later integers sent in the protocol are encoded as four bytes big-endian.

After the fixed headers come eight reserved bytes, which are all zero in all current implementations. If you wish to extend the protocol using these bytes, please coordinate with Bram Cohen to make sure all extensions are done compatibly.

Next comes the 20 byte sha1 hash of the bencoded form of the info value from the metainfo file. (This is the same value which is announced as `info_hash` to the tracker, only here it's raw instead of quoted here). If both sides don't send the same value, they sever the connection. The one possible exception is if a downloader wants to do multiple downloads over a single port, they may wait for incoming connections to give a download hash first, and respond with the same one if it's in their list.

After the download hash comes the 20-byte peer id which is reported in tracker requests and contained in peer lists in tracker responses. If the receiving side's peer id doesn't match the one the initiating side expects, it severs the connection.

That's it for handshaking, next comes an alternating stream of length prefixes and messages. Messages of length zero are keepalives, and ignored. Keepalives are generally sent once every two minutes, but note that timeouts can be done much more quickly when data is expected.

## peer messages

All non-keepalive messages start with a single byte which gives their type.

The possible values are:

- 0 - choke
- 1 - unchoke
- 2 - interested
- 3 - not interested
- 4 - have
- 5 - bitfield
- 6 - request
- 7 - piece
- 8 - cancel

'choke', 'unchoke', 'interested', and 'not interested' have no payload.

'bitfield' is only ever sent as the first message. Its payload is a bitfield with each index that downloader has sent set to one and the rest set to zero. Downloaders which don't have anything yet may skip the 'bitfield' message. The first byte of the bitfield corresponds to indices 0 - 7 from high bit to low bit, respectively. The next one 8-15, etc. Spare bits at the end are set to zero.

The 'have' message's payload is a single number, the index which that downloader just completed and checked the hash of.

'request' messages contain an index, begin, and length. The last two are byte offsets. Length is generally a power of two unless it gets truncated by the end of the file. All current implementations use  $2^{14}$  (16 kiB), and close connections which request an amount greater than that.

'cancel' messages have the same payload as request messages. They are generally only sent towards the end of a download, during what's called 'endgame mode'. When a download is almost complete, there's a tendency for the last few pieces to all be downloaded off a single hosed modem line, taking a very long time. To make sure the last few pieces come in quickly, once requests for all pieces a given downloader doesn't have yet are currently pending, it sends requests for everything to everyone it's downloading from. To keep this from becoming horribly inefficient, it sends cancels to everyone else every time a piece arrives.

'piece' messages contain an index, begin, and piece. Note that they are correlated with request messages implicitly. It's possible for an unexpected piece to arrive if choke and unchoke messages are sent in quick succession and/or transfer is going very slowly.

Downloaders generally download pieces in random order, which does a reasonably good job of keeping them from having a strict subset or superset of the pieces of any of their peers.

Choking is done for several reasons. TCP congestion control behaves very poorly when sending over many connections at once. Also, choking lets each peer use a tit-for-tat-ish algorithm to ensure that they get a consistent download rate.

The choking algorithm described below is the currently deployed one. It is very important that all new algorithms work well both in a network consisting entirely of themselves and in a network consisting mostly of this one.

There are several criteria a good choking algorithm should meet. It should cap the number of simultaneous uploads for good TCP performance. It should avoid choking and unchoking quickly, known as 'fibrillation'. It should reciprocate to peers who let it download. Finally, it should try out unused connections once in a while to find out if they might be better than the currently used ones, known as optimistic unchoking.

The currently deployed choking algorithm avoids fibrillation by only changing who's choked once every ten seconds. It does reciprocation and number of uploads capping by unchoking the four peers which it has the best download rates from and are interested. Peers which have a better upload rate but aren't interested get unchoked and if they become interested the worst uploader gets choked. If a downloader has a complete file, it uses its upload rate rather than its download rate to decide who to unchoke.

For optimistic unchoking, at any one time there is a single peer which is unchoked regardless of its upload rate (if interested, it counts as one of the four allowed downloaders.) Which peer is optimistically unchoked rotates every 30 seconds. To give them a decent chance of getting a complete piece to upload, new connections are three times as likely to start as the current optimistic unchoke as anywhere else in the rotation.

## Resources

- The [BitTorrent Economics Paper](#) outlines some request and choking algorithms clients should implement for optimal performance
- When developing a new implementation the [Wireshark protocol analyzer](#) and its [dissectors for bittorrent](#) can be useful to debug and compare with existing ones.

## Copyright

This document has been placed in the public domain.